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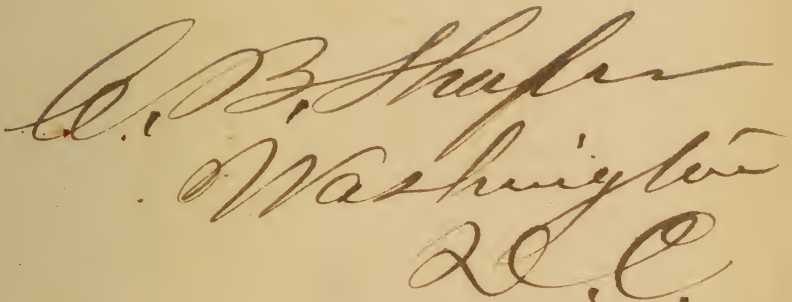

A. B. Shafer
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A TREATISE
ON
MINERAL WATERS
AND
SEA-SIDE RESORTS.

A TREATISE

ON

MINERAL WATERS

AND

SEA-SIDE RESORTS,

DESCRIPTIVE AND MEDICAL,

BY

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BALTIMORE:
Published by JOHN B. PIET & Co.,
174 W. Baltimore Street.
1883.

In Exch.
Mr. C. B. Schafer

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PREFACE.

Year by year the increasing necessity for a guide to the use of mineral waters has been felt by the public and especially visitors sojourning at the mineral springs of America.

The fame these springs have attained as watering places, has not realized the anticipations of earlier years, simply because the therapeutic properties of the waters and the proper methods of their application, both internally and externally, have been so little understood. When their effects are better understood, their reputation will increase from year to year, until they rival the famous watering places of England, Germany and France; for, according to their chemical analysis, they should rank among the very best of their kind, an opinion upon which the best writers on mineral waters unanimously agree.

At all European watering places the method of administration of the waters, whether as Drink, as Baths, as Douches, as Inhalations, or as Gargles, together with certain dietetic rules, claims the first attention, while in this country the waters are usually taken *on chance* and in the most reckless manner. This is a most deplorable mistake, which has often resulted in a total failure of the cure, as well as in loss of time and money.

To call attention to these matters, and to make visitors acquainted with everything that may be useful to know respecting them, as well as to give invalids who take the waters some dietetic hints, the observance of which is necessary, in order to derive full benefit from the waters is the motive which prompts the publication of this small volume.

Each chapter will be found to form a complete essay in itself, based upon information acquired by close observation, extensive research, and personal interviews with experienced physicians at most of the celebrated watering places in Europe.

Wherever chronic disease is to be found, there must also exist a demand for a popular treatise on mineral waters; and it is towards feeding such a demand that the author has ventured to contribute this work, trusting that it may not be received altogether without favor.

Baltimore, May 31st, 1883.

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A TREATISE ON MINERAL WATERS.

CHAPTER I.

Antiquity of Mineral Waters. Their Source, Temperature, Mineral Constituents, Phenomena and Laws. Relation to the Organism, Therapeutic Value, &c., &c.

For Centuries mineral waters have held a high rank in the domain of Therapeutics and their importance has continued to increase until extensive depots for their sale have been established in all large cities.

We give the name of "mineral waters" to those waters which receive their natural temperature, and solid and gaseous ingredients in a chemical and mechanical way in the depth of the earth, and being more or less mineralized or warm can be employed as medical agents.

A part of the water covering the surface of the globe is, principally by the aid of atmospheric temperature, reduced to vapor, which after rising so as to form clouds again descends as rain, snow, &c., and in this form is absorbed by the soil, and penetrating fissures and cliffs, ultimately accumulates in subterranean reservoirs until its quantity and the pressure of gases forces it again to rise to the surface of the earth, where it appears as "a spring."

The heat of the earth increases in a geometrical proportion with the depth penetrated, so that the depth of

a subterranean reservoir may be determined by the temperature of the water which flows from it. The deeper the surface water penetrates into the earth, the hotter will be the strata with which it comes into contact, and these strata impart their own temperature to the water which passes through or lies within them; hence the high temperature of many springs. Considered approximatively, water having a temperature of blood heat, 98° Fah. would have its reservoir at a depth of about 4,000 feet.

The water receives its mineral constituents by becoming first impregnated with the great quantity of carbonic acid contained in the earth, and being further supported by strong atmospheric counter-pressure, it is ultimately enabled to dissolve solid minerals existing in its course, both by mechanical and chemical action, and to retain the dissolved salts which are kept in solution by the aid of carbonic acid gas.

Among the mineral springs of Europe there are some, as Bath in England, Wilbad in Germany, Teplitz in Austria, Ragatz in Switzerland, and Evian and Divoune in France, in which the mineral elements are insignificant, and nevertheless their waters enjoy recognized medical properties, and claim a high place in hydrology.

There are skeptics who, seeing the small quantity of mineral principles held in solution in the waters, deny their power; but experience teaches us that they often act with great power and cannot be taken with impunity.

Dr. Garrigon has reported several deaths resulting from the free use of the waters of Aix; and instances are not infrequent where invalids of a sanguine temperament have suffered severely from the injudicious use of Carlsbad waters. An example is given by Dr. Kraus of an Englishman who persisted, against the advice of the physician, in drinking every morning the Sprudal water according to his own pleasure, and the imprudence was only too cruelly avenged by his death within nine days. The author has himself observed several cases of alarming congestion of the brain and of the lungs following the too free use of the Greenbrier White Sulphur Waters in West Virginia.

The organic principles existing in mineral waters, however minute, undoubtedly influence, to a greater or less extent, their action upon the human organism; their affinity for oxygen justifies the theory that they may act by deoxydising the blood. Electricity is believed also to play an important role in the action of mineral waters, but its action is not yet well understood. Both Erdmann and Gottl have discovered negative electro-magnetic currents eminating from the warmer Carsbad Springs, but their precise influence upon the system has not been determined.

But a more direct argument with which to meet those who deny the action of mineral waters, because they contain in solution so small a quantity of mineral principles,

is the fact that the ordinary water which we commonly drink contains only an infinitesimal quantity of minerals, but, even in this minute quantity, Chossat has demonstrated that they exercise an important influence upon animal life. He nourished a pigeon with all the food that it could desire, but gave it only distilled or chemically pure water to drink—that is to say water deprived of every mineral principle—and at the end of a month the pigeon died of inanition, surrounded by every kind of food. Again, Boussingault has found that animals assimilate a greater quantity of phosphate of lime than exists in the food which they eat, and this excess can only be derived from the water which they drink. If then the mineral principles which exist in ordinary drinking water in the most infinitesimal quantity exerts such an important influence upon animal life, is it not evident that the same principles, when existing in an appreciable quantity, as is the case in mineral waters, will exert a still more powerful influence upon the human organism?

Mineral waters often contain principles which cannot be detected by the ordinary analysis of a single gallon of water. By operating upon a large volume of water—20 or 30 gallons—and by the aid of the spectroscope and the Bunsen flame, chemists have been enabled to discover in mineral waters some new metals as Caesium and Rubidium. By this process Dr. Garragan detected the presence of lithia, a comparatively new mineral prin-

ciple, in the waters of Eaux-Bonnes, France; and it was only recently that Baron Thenard discovered arsenic in the waters of Mont-Dore, a discovery which at once served to explain, in a measure, the therapeutic effect of these waters in the treatment of acute and chronic tuburculosis, in scrofula, granular laryngitis and various skin affections. The beneficial effects of certain waters in the treatment of gout, rheumatism and the different arthretic manifestations have also been explained by the aid of the spectroscope, in detecting in them large quantities of lithia, which Garard in England, Ruef in Germany, Lietrich in Austria and Charcot in France, affirm possesses the power of dissolving and eliminating alkaline urates, and thereby contributes to overcome the uric acid diathesis and its manifestations.

The human body is moreover richer in mineral properties than is generally believed. It possesses even some of the metals which the miner seeks in the depths of the earth. We do not find, it is true, among the constituent elements of the body either gold or silver, but we find iron, lithia, manganese, and it is said lead and copper; according to Lhote and Bergeron, the latter metal is found in the liver, the kidneys and the brain. We also find in the human body phosphorus, sulphur, silica, fluorine, potassium, sodium, calcium and magnesium; and if we add to these oxygen, carbon, hydrogen and nitrogen we shall have a sufficiently long list of elements constituting

the human body. But our blood also contains a whole series of mineral principles, as potassium, sodium, ammonium, carbonates and phosphates of lime, soda, magnesia, iron, &c.

All these minerals are essential to the constitution of the organism. They are brought to us by food and drinks. They exist in the body in infinitesimal but necessary quantities. For example, iron enters into the composition of the body in the most minute quantity, yet it is none the less indispensable to life: and the necessity for it, small as the quantity may be, serves to demonstrate the efficacious intervention of infinitely small things in the phenomina of life. If our *regime* were absolutely deprived of iron, the organism would soon suffer and finally perish. Even vegetables which grow in a soil that contains no trace of iron will soon be touched with a vegetable chlorosis. Prince Hortsmar demonstrated this fact by sowing seed in a soil deprived of iron. The result was a pale and sickly growth; but the introduction of a ferrugenous element into the soil caused the vegetable chlorosis, in due time, to disappear. As the means of investigation are perfected, we shall doubtless find that the list of metals contained in the tissues of the body, as well as dissolved in mineral waters will be increased.

We may pertinently ask whether certain maladies, the origin and existence of which are not fully comprehended,

do not coincide with the absence of certain metals in the human body? Chlorosis and anemia are coincident with the diminution of iron in the blood, goitre with the absence of iodine in the drinking water, and softening of the bones with the loss of calcarious matter. The same principle is applied in agriculture. We practice what the French call *l'assolement*, which consists in returning to the soil those elements of which it has been deprived by vegetation; and so in therapeutics, we seek to impart to the system by the use of mineral waters, which are easily assimilated, certain principles which it may require.

The relation existing between the human body and mineral waters did not escape the great Sydenham:—He said, in speaking of calybiate waters; "They communicate their virtue, when taken internally, to the blood, and heal the sick more certainly and efficaciously than the most valuable preparations of iron prepared in the laboratory of the chemist." Dr. Bazin, the eminent professor of Dermatology in the Hospital St. Louis, Paris, held similar views in regard to the efficacy of Sulphur waters in the treatment of skin diseases. After having tried all the preparations of Sulphur, he recognized the fact that there was not one whose action could be placed in parallel with Sulphur water as a curative agent in these affections.

It may be true, as is sometimes alleged, that mineral waters become a matter of fashion; but if they are a

fashion, it is simply because they constitute a complex remedy more efficaceous than any prepared by the pharmacist. For example, we will feel the physiological effects of twenty grains of iron absorbed from drinking a quantity of Chalybeate water, more than if ten times that amount were absorbed from taking pills. Why is this the case? It is not alone because the iron contained in the mineral water is more easily absorbed, but it is also from the fact, that it receives the concurrent aid of all the other mineral elements associated with it, and which seem to multiply its action as the spool of the electro-multiplier augments the force of the electric current.

Experience teaches us that the greater part of chronic ailments are more or less amenable to treatment by mineral waters, and there are few constitutional maladies which they will not happily modify. They often ameliorate with surprising rapidity the gouty, rheumatic, scrofulous, herpatic and syphilitic diathases. We learn also from experience that mineral waters are valuable in many acute affections, and they may be employed with advantage as a resolvent, alterative, sedative and restorative agent. In a word, they act upon the whole of the organism, giving it, as it were, "the spur" which stimulates the curative force to new effort. It is this multiple action which constitutes the therapeutic modality of of mineral waters, giving them a grand superiority over other remedies which have only a local action. It is not,

therefore, without reason, that the great specialtists and eminent practitioners of Europe send their patients to mineral springs to be healed; that Bazan of Paris sends his psoriasis to Royat; that Hardy sends his herpes to St. Gervis; that de Mussy sends certain affections of the chest to the arsenic waters of Mont-Dore; that Calvo sends his syphilitics to the sulphur waters of Aix; that Thompson of London sends his calculus and gouty patients to Marienbad and Pullna; that Garrett of London sends his rheumatic and malarial patients to Aix-la-Chappelle; that Canettoli of Naples sends to Ischia the lymphatic and scrofulous.

In beginning the treatment of an existing malady by mineral waters, the disease will at first generally appear to be aggravated; the waters seem to make disorder of order, and act, as it were, in the manner of the infernal stone. At first they irritate, causing the malady to pass into a more acute stage, and then they heal.

CHAPTER II.

Healing properties of Mineral Waters. Relative value of natural and artificial waters. Their peculiar effect and mode of action. Valuable in chronic diseases. Combination of mineral elements. Vices of our social state. Water the best restorer of the body. Effect of temperature. Importance of a strict diet, &c., &c.

From olden times the healing power of mineral waters has enjoyed a high reputation in many diseases, especially in disturbances of the digestive and nutritive system; in glandular affections either simple or complicated; in diseases of the organs of the chest, so far as they can be influenced by curative agents; in chronic and acute hepatic and renal diseases; in all forms of articular disease resulting from rheumatism, gout, scrofula or mechanical injuries; in congestive conditions of the nerve-centres, and their results, sciatica and other neuralgic pains; in cutaneous diseases; in the diseases peculiar to women, and in the various forms of septic poisoning.

But it is not at all the same thing, that the patient expecting to be cured, considers mineral waters as a wonderful gift of God which only requires to be taken in good faith; or that he sees in them only a remedy which

implies various obligations and attentions on his part, which, if carelessly taken, may either not benefit him at all, or perhaps even harm him.

The question as to whether natural mineral waters possess so called latent or specific properties and advantages which are not possessed by artificial waters, has not been fully decided up to this time. But if among the thousands who annually visit mineral springs and judiciously use the waters, we see many recover, and others, whose complete recovery was doubtful from the beginning, partially restored to health, we must accord to the waters at least that consequence which other remedial agencies claim for themselves, and which, as a rule, have no better foundation or recommendation.

Now, if we look for the causes of the peculiar and often surprising action of natural mineral waters, they are to be found in the fact that these waters are very compound remedies, and although the therapeutic action of the several component parts, such as the salts and gases, have been pretty closely studied, we have to deal here with the combined action of a great number of substances, which cannot be identical with the total of the separate action, because they partly assist and partly impede each other in their effect upon the organism. Prof. Niemeyer, one of the leading men of the medical profession in modern times, says: "The rule for every doctor to make his prescription as simple as possible does not apply

where a laxative is prescribed whose use shall be continued for months. *Compounds of medical remedies do better service in such cases than each one of these remedies alone.*"

Thus we find that this combination of elements in mineral waters, which produces an effect not to be obtained by the application of these elements separately, makes them remedies of inestimable value, especially in chronic diseases, where we can allow them to act upon the patient without disadvantage to his organism, and until we have gained the desired end. Perhaps the reason why they can be taken so long without detriment to the system is to be found in the circumstance, that in general they do not consist of any other elements than those contained already in the organism itself. At all events, there must be an existing sympathy, for we find, that while sufferers from chronic diseases in a short time take an aversion to most physic prescribed for them, on the contrary, with the protracted use of mineral waters the desire to drink them increases with their use, and with many patients it is indeed hard to repress.

"*Cessante causa, cessat effectus*" is a favorite maxim with all rational physicians, and has taught them their greatest success in the treatment of disease. It is this principle of attacking disease at the root, and thus removing its cause, which should prevail in dealing with the victims of pernicious climates, and with the legion of

those chronic disorders produced by the continued action of unhealthy local influences, as well as those sanitary derangements which may be considered as the result of a protracted and ill directed bodily and mental diet.

The celebrated Dr. Dumoulin, on his death bed, said to his pupils who surrounded him: "I leave behind me three great physicians;—Water, Exercise and Diet." It is these three therapeutic agents, which form the basis of all cures by mineral waters, and they derive their power from the principle on which they rest. Most physicians incline to the opinion that the prevailing types of disease, which, at the present day, so strikingly manifest themselves in numerous nervous and gastric affections, accompanied by an impoverished condition of the blood, is but the natural resistance of the human organism to the growing exigences and consequences of an exaggerated civilization. The fatigue of mind; the over excitement of the nervous system, produced by individual and social influences; a nourishment too exciting and little in harmony with the needs of the body; a sedentary life and consequently a want of physical exercise are some of the vices of our social state which give rise to a crowd of chronic maladies, affecting more particularly the upper classes of society. Remedies which do not reform these abnormal conditions can only be considered as palliatives for certain morbid manifestations, and not as radical cures. Feeling then the need of reform, we must aban-

don, in many cases, the arsenal of pharmacy and have recourse to other remedies.

Pindar has said: "*Water is the best remedy.*" This, from its simplicity and its natural relations to the physiological functions of the body, is particularly suited, when accompanied by a mode of life in conformity with the laws of nature, to restore the body to a normal condition. Of all material and immaterial healing-agencies none have been more highly prized by physicians, in all ages, than those which are able to produce that undisturbed serenity of the mind so indispensable to the health and strength of the body. The latin maxim *mens sano in corpore sano*,—a healthy mind can dwell only in a healthy body,—will lose none of its force if we reverse the proposition and say: Only a healthy mind can keep the body healthy and vigorous.

That which has been said in reference to water as a curative agent applies more particularly to mineral waters, to which nature, by the admixture of certain principles, has given certain valuable properties. If ordinary spring water is capable of exercising a salutary influence upon the body, by stimulating the pores of the skin and rendering the secretory system more active, it cannot be denied that in most cases the mineral principles superadded will add to the virtues of this element, not only by stimulating certain functions, but also by producing an alterative effect upon the system generally, but up to this

time physico-chemical researches have given no results sufficiently exact to establish the manner of these alterations. It has been stated, in a general way, that alterations are produced in the organism by mineral waters, and that they reveal themselves to the judgment of the physician by the metamorphosis which they work in the phenomina of life.

Next to the mineral principles, the temperature of the water constitutes an important factor. In each individual case, it is important to discriminate as to the temperature of the mineral water to be used either internally or externally; whether it is necessary to produce a greater amount of heat in the organism or to reduce the temperature in order to aid the functions of nutrition and elimination, and thereby restore the system to a normal, healthy condition. There is a certain class of cases, for example, affections of the mucous membranes, especially of the respiratory organs, in which warm mineral waters, whether applied internally or externally, will be found most efficacious. Every physician who is not ignorant of the functions of the skin and other organs of excretion and secretion, knows and can himself explain the happy influence of warm baths upon diseases of the interior organs.

In the mineral water cures, as indeed in all cures, a strict regard to diet is of the greatest importance, and will contribute essentially to the success of the treatment. Celcus has said: "*Optimum vero medicamentum est*

opportune cibus datus"—a suitable regimen is the most efficacious remedy. In general, simple and easily digested food, which nourishes the body without irritating it, is to be recommended in every mineral water cure; but the regimen is to be modified according to circumstances, as the nature of the water, the disease, the temperament of the patient, &c.

Exercise, that is to say a proper use of the physical forces, is in a majority of cases a powerful auxiliary in the treatment of disease by mineral waters; but in as much as moderate exercise is salutary, so fatiguing or excessive exercise may become decidedly hurtful to persons of an irritable and nervous temperament. It is necessary also to give attention to the manner of clothing ones self, which ought to be regulated according to the temperature and the hour of the day, as well as the temperament, habits and disease of each person.

The moral regime is of no less importance than the physical regime. Goethe said pleasantly: "Do you wish to know your first duty?—It is to live joyfully and have no other study than to chase away *ennui* and discontent." He, who worried with care or devoured by passion, approaches the fountain of health, so beneficial to others, has nothing to expect. Let him remember the inscription of Antoninus on the public baths erected by him in Rome: "Go to this place free from care, that you may leave it free from sickness; he who carries care

with him is not healed here."

It is necessary also to avoid, during the process of cure, fatiguing intellectual work. Such work exacts a sedentary life, which is necessarily prejudicial to health. An interesting play or lecture, provided it provokes no strong emotions, is an amusement as salutary as innocent. The man or woman capable of tasting the charms of society will scarcely want for it at a watering place; for although the ideal life which one formerly led at these places has in a measure disappeared, they are nevertheless united still by a reciprocal sympathy.

A very important influence upon the mind and body is the surrounding landscape, and in this respect the springs and mountain resorts of America have found a very powerful ally to their action in the beautiful scenery which surrounds them. Situated usually in pleasant green valleys, in the immediate vicinity of well wooded hills, they enjoy not only the charms of a rich, well cultivated country, but also the presence of majestic mountain ranges, which not only gladden the eye, but also exert a favorable influence upon the climatic conditions, and afford abundant opportunities to the valetudinarian for invigorating exercise.

Upon the Mosaic floor of the Elizabethen spring at Homburg is to be seen these words: "The Lord has created medicines out of the earth, and he that is wise will not abhor them." But let not the invalid think that

he has done enough if he faithfully takes this medicine and considers himself dispensed from further bodily and mental diet; he must remember that a careful observance of other matters is absolutely necessary for him, if the waters are really to become a healing medicine to him. The latent mystery of the water will be greatly aided by proper diet, heathful exercise, pure air and reliable medical advice.

But neither the best climate, nor any other condition can guarantee restoration to that health the patient seeks far from his own home, unless he keeps the object of his sojourn at the springs ever before his eyes. Recuperation, recovery from illness, warding off threatening disease, can only be ensured by his own watchful care. More emphatic when applied to health, than in any other case are the winged words: "Man is master of his fate, its preservation, its promotion and its recovery." Without due attention to the rules of a healthy life, hopeful treatment of chronic disease is a chimera, hence the most absolute directions must be given and rightly enforced. And herein lies the explanation of the assertion that the most diversely situated climatic resorts have gained reputations for themselves, though among these are some of which it could scarcely have been predicted that they would become *winter* resorts. Far less can we declare that any amelioration which may occur is the effect of the place, rather than the regular and strict life of the patient and the careful direction to which he submits himself.

CHARTER III.

Location and Climate. Elevation. Meteorological conditions. Intermediate health resorts. Sub-tropical climates. Warm clothing. Cool mornings and evenings. Light fogs and transparent atmospheres. Healthfulness of mountain climates. Vegetation, Flora and Forests. Culture of the grape. Endemic and epidemic diseases, &c.

The mineral springs of America owe the high rank which they hold among watering places, not alone to the remarkable effects of their mineral waters, but also to their favorable situation and good climate, which have contributed not a little to their fame as health resorts.

These springs lie mostly in the valleys of richly wooded mountain chains, from the foot of which come forth their famous waters. These mountain ranges attain a hight of from 1,000 to 3,500 feet above the level of the sea, and thrust out in every direction protecting spurs which surround the country in unbroken chains. In harmony with such local influences the valleys of the various springs are for the most part warm and sheltered, so that spring commences early and the autums are usually long continued, while the heat of summer is at no time oppressive; the thermometor rarely attaining, in the middle of the day, a higher degree than 85 Fah., while at night cool strata of air descend from the mountain hights into the valleys, affording a refreshing temperature for sleep.

Cold winds are rarely felt, the disposition of the mountain ranges being such as to turn them aside; but gently as the local winds usually blow, their beneficial influence is very great, inasmuch as they constantly bring fresh supplies of pure air and thus maintain the atmosphere in a healthy state.

The moisture of the air and the atmospheric deposits are important in a climatic relation. The summer rains are usually from the South and West, but the clouds in their long journey have lost a great deal of their moisture before entering the valleys and they find no opportunity to prolong their sojourn among the mountains, but quickly pass over; and the geological formation—strongly fissured slate—is such as to permit of the ready percolation of the water that falls. Under these circumstances no surprise will be felt that the soil is characterized by dryness. Wet roads and soaking grounds are rarely experienced in the summer season. It is also worthy of observation that the atmospheric pressure in the mountains is usually very low, not coinciding by any means with the pressure which might be expected when the elevation above the sea is taken into consideration.

The above data renders it quite apparent that, climatically regarded, the American Springs are highly favored, while their meteorological conditions, consequent upon situation and surroundings, are certainly of a peculiarly favorable nature. The prevalence of West and South

currents, the moderate wind pressure, the insignificance of local winds and the uniformity of temperature all conduce to maintain a relatively mild and dry atmosphere.

The merit of a climatic resort is not determined solely by temperature. It is well known that those suffering from Chest affections must primarily consider the influence of weather. Disturbances of the respiratory organs are chiefly brought about by atmospheric influences, precisely as dietetic faults produce disorders of the digestive functions. We can adduce instances enough of perfect cures having resulted from a sojourn at winter resorts with the most variable climates—warm, cold or moderate. The cool air of a summer resort is more grateful to a sufferer from lung disease than are hot, oppressive atmospheres. Hence, it is quite certain that a specially high temperature is not the active agent, the resolvent factor in chest diseases. For persons with other ailments, and for such as seek rest and refreshment, a higher temperature is still less important and may even be undesirable. The determining reason must be sought in the origin of the disease, and this more especially in chronic cases. Warmth is very rarely the agent which will be the most active in uprooting the evil and its consequences.

As an intermediate resort, many of the American springs could with proper arrangements for maintaining a uniform temperature within doors, be made most de-

sirable, whether as an autumn resting place between northerly and southerly regions, or vice versa, after a winter residence in warm climates. To some patients afflicted with far advanced pulmonary disease they may not be suitable, should they not prefer to remain in the loving care of their families, as they most certainly should do. But to such as are compelled to leave their homes in the early fall, a sudden transplanting to the enervating South might not be without evil effects; and it would be difficult to find a resort which would better prepare them for their winter quarters than could be found at many of the springs in the middle and southern states.

In spring, when the quick rise of southern temperature hurries the departure of the patient, and northern regions are yet too cold, these intermediate localities offer almost the identical climatic conditions required. After a short stay at one of these mountain resorts, the cooler native air is borne without inconvenience, and invalids visiting or returning from southern resorts could not find a more favorable climate than the mountains of Virginia, West Virginia, North Carolina, Tennessee and Kentucky.

Winter arrangements are not difficult to make, and there can be no doubt when made would well repay the outlay; for many of these springs may fairly lay claim to high rank as intermediate resorts, and would without

doubt command a large patronage for at least nine months in the year.

It is true that here, as in all temperate zones, sudden changes will occur; for it is only in the tropics that the seasons maintain their uniformity of character. In sub-tropical regions a uniform temperature is not to be expected. Every district in the temperate zone must participate in the variations that occur, and share the fate from time to time of other extolled resorts, which however favorably situated, may, in certain years find themselves worse off than their rivals. Do we not find that climatic resorts in the Alps and in southern Europe have their colder seasons and often extraordinarily low temperatures during the winter?* And all the more sensative to such changes is the visitor, in as much as his summer sojourn has rendered him susceptible to cold, and the houses intended only for warm weather, are illy adapted for comfort when the thermometer falls below 60° Fah.

If the situation and physical characters of a place are favorable, if a medium average with regard to warmth, moisture, winds, &c., is attained, a high place must be assigned it in the scale of health resorts.

Taking everything into consideration the air of these resorts may be characterized as a dry, pure, bracing and

*During the author's stay in Europe in the winter of 1882-83, heavy snow storms prevailed in central Europe, in the South of France, in Turin, Florence, Rome, Naples and even Madrid.

strengthening mountain air, which by increasing and accelerating organic changes, improves the blood and promotes the nourishment of the body, thereby acting as a powerful auxiliary to the mineral waters themselves.

The remark, that "the action of mineral waters is greatly enhanced by drinking them at the source," is not entirely based upon the circumstance, that the waters when shipped to a distance lose any of their healing powers, but it is easily explained if we consider that here climate and water combine in their actions, so that the suffering patient may undoubtedly expect a better result if he drinks the water at the spring.

It has been stated above, that the temperature at most American springs is on an average of medium warmth and pretty uniform during the summer; but rapid changes do sometimes occur, for which reason the visitor should always come provided with warm clothing for an emergency. To this may be added, that even during the hottest days of June, July and August, the mornings and evenings are comparatively cool.

While there are no regular rainy months at these resorts, yet a few rainy days sometimes occur in one month, sometimes in another, bnt these rains are very rarely lasting, and the moisture produced by them quickly dis, appears. Heavy fogs are not often experienced during the summer months, but frequently a thin vapory veil is seen ascending the mountains, which gives to thirsty

vegetation the moisture necessary for luxuriant growth. Late in the autumn, however, it is not unusual to observe fogs during the early morning hours, which either descend as dew or are quickly dissolved by the rising sun. The months of September, October and often November are frequently the most agreeable of the whole year, and the cool, clear and dry days, the particularly clear and transparent atmosphere, the autumnal woods with their variegated foliage, all combine to render this the most pleasant period of the year;—a season which has been celebrated in poetry and prose, under the name of "Indian Summer."

Winter here as elsewhere, brings bad weather in its train, but the atmosphere, even in mid-winter, retains a peculiar dryness, so that even during long continued cold its bracing action may be felt; and nothing can better exhibit the excellence of the climate than the plentitude of its blessings as exhibited in the health statistics. Diseases peculiar to other localities are of rare occurrence here. Intermittent Fever is unknown, unless it be of imported origin. Typhoid Fever, which now and then prevails in the mountains, is always traceable to violations of the simplest and most obvious laws of hygiene; but even this disease has notably diminished since the inhabitants have brought to bear a reasonable amount of care in promoting and preserving a favorable sanitary state. Among the poorer classes even, scrofulous affec-

tions are infrequent and generally attributable to improper food rather than atmospheric influences. It is a notable fact that inflamatory affections do not frequently occur in the severe seasons of the year, nor are they often of any intensity when they do crop out. It is true that simple catarrhs frequently occur, but severe inflammations very rarely. Rheumatic Fever may also be classed as comparatively rare, while neuralgias are of more frequent occurrence. The like statements apply to infantile complaints, instances of inflammatory croup being less frequent than in the low lands.

We must not fail, as connected with the subject of climate, to glance at the vegetation which abounds in the mountain regions of America. There is no better criterion to judge of the condition of the climate and the condition of the soil of a locality than by the observation of its plants. Without motion and fixed to the spot which contains the conditions of their origin and their further development, the children of Flora live their dreamy life, and are for the observer mute yet eloquent witnesses of occurences which exert their unfailing influences upon the welfare of mankind. Luxuriant and full of vitality, they fulfill under favorable conditions their entire functions, that is, they germinate and grow, they bloom and ripen their fruit, and die as soon as the task of their lives is accomplished.

If all the conditions favorable for their existence are

not united, the latter is not necessarily endangered, but then they will only develop those vegetable organs which are absolutey necessary for their existence. Such is the case with many cryptogams which form roots, branches, twigs and leaves, but neither flowers nor fruit. If these scanty conditions of life should be altogether wanting, the possibility of the continued existence of the plant is entirely removed, and it disappears from that part of the country; but through this disappearance it becomes as interesting to the observer as its blooming sisters, which by their presence tell him of the conditions necessary for their existence.

"The soil," says Prof. Hoffman, "exhibits to a certain degree its entire interior in the plants which cover it; peat betrays itself by peculiar plants which only grow here in large quantities and in perfection. Swamps which contain salt are recognized by certain plants which are nowhere found except on the sea shore. An exact knowledge of these conditions is even of a certain practical value; it furnishes hints for the culture of newly cleared tracks, it gives information on the condition and the intrinsic value of the ground;" and, it may be added, *often very clearly characterizes the climate prevailing in a certain country.*

In addition to the Flora, these mountains are covered with fragrant and luxuriant forests which produce in summer an agreeable coolness, while in winter they

diffuse an apparent warmth. They consist of several kinds of oak, chestnut, maple and a variety of soft woods. Pines also cover considerable districts in the valleys and perfume the air with their balsamic odors, at the same time impregnating it with ozone or peroxide of hydrogen, rendering it more salubrious.

These forests abound in game, which, during the hot season, retires more into the depths of the mountains, while in winter, especially when there is a good deal of snow, it descends into the valleys where it chiefly seeks shelter from the warm pine woods, generally avoiding exposed districts. The valleys are interspersed with lovely meadows and are traversed by limpid mountain brooks which abound in a variety of fish, especially trout and bass, affording fine sport for anglers. The luxuriant and charming vegetation of the valleys and hills, chiefly ferns and mosses, impart freshness to the scenery around, and amusement and instruction to the admirer of nature.

Although the culture of the grape is not generally carried on in these sections, still many vines may be seen on trellis-work in gardens, as well as on the sides of many hills, where their fruit ripens in considerable quantities.

The theoretical supposition that the condition of the soil, the water and the climate as detailed above can neither be a source of epidemic nor endemic diseases, is fully confirmed by experience. The entire absence of

swamps and stagnant waters prevents the formation of malaria, so that, as above stated, intermittent fevers, as well as other diseases of malarial origin, rarely, if ever, originate in these sections of the country. The low state of the underground water, the extraordinarily triffling variations of its surface, as well as the heavy and impermeable layer of earth spread over it, the entire cleanliness of the soil and the fresh mountain air, all combine to prevent the origin of epidemics of any kind. Of course there is no immunity for any place from diseases being introduced; but we need scarcely mention here, that such accidents must be regarded as consequences of a general calamity and cannot be considered as essential factors in judging of the sanitary conditions of a place. Diseases thus introduced rarely spread, but are generally confined to a small circle, and pass off in a comparatively easy and light manner.

CHAPTER IV.

Beginning of the "season." Mid-summer. Average temperature. Drinking and bathing. Healing influence of mineral waters. How to drink them. Absorption facilitated by exercise. External use of the waters. Full or cabinet baths. Temperature of bath. Baths in menstruation and pregnancy. Method of taking baths, &c.

The "season" at the American springs usually begins the 1st of June; but not a few patients select the month of May for a repetition of their "cure" after having, during a former course, made acquaintance with the climatic advantages, &c. During June the number of visitors increases rapidly and is frequently considerable, though July, August and September may be defined as "the season" *par excellence;* but as the weather is usually settled and pleasant in the early part of autumn, the season is often extended into October and even November. Very few particulars concerning the weather in autumn and spring can be given, and we must content ourselves by giving some data relating to summer. The course of the summer temperature is tolerably uniform; there being rarely any marked interruption to moderately warm days. The temperature in the evenings is usually mild and pleasant, but the coolness of the nights is per-

ceptably felt, so that blankets are nearly always required. The pleasantest time in the summer is the early morning, when the temperature is usually delightful. During the afternoon hours the shady grounds afford cool and refreshing walks. The promenades in the grounds are generally shaded by avenues of trees and are kept fresh and cool by constant waterings. The hills and mountain sides in the vicinity of most of the springs are in all directions intersected by shady walks, and thus invite the visitor to more or less distant excursions.

In addition to the above data the following will be found to be about the average temperature of the three summer months at the watering places of America.

	June.	*July.*	*August.*	*Summer.*
Mean Temp.	65.	68.	67.	66⅔.

Formerly the use of the waters of most American springs was restricted to drinking, but now bathing is recognized as an important part of the course, and has of late years achieved a position of equal importance to that of taking the waters internally. Experience has shown that the internal use of the water is vastly aided by the baths in a majority of diseases—particularly in chronic rheumatism, gout and other articular affections.

The restriction of the spheres of disease for which the waters of the various springs are indicated, has been considered and has always verged towards specializing, and thus certain classes, of disease have been assigned

to certain springs, as coming within their salutary influence in a more remarkable degree. It may be said once for all, that the healing influence of mineral waters does not proceed from any one principle, either of purgation, sedation, excitation or alteration, but from the combined influence of their constituents on the blood and upon local pathological processes. Absorbed into the blood, mineral waters exercise a powerful influence in a variety of diseases based upon abnormal secretions, and while reducing further secretions they enable the organism to overcome the mass of secreted matter by natural absorption, thereby reducing swellings of the joints, hypertrophy of the organs and, generally, chronic inflammatory deposits of various characters.

For the right application of mineral waters it is necessary to comprehend the exact nature of the complaint under which the patient is laboring, and the more thoroughly this is understood, the more easily will the right way be chosen. For this reason the invalid should always seek the advice of a physician to whom the diseases upon which the waters are supposed to exercise a salutary influence, have necessarily been a special study. The following suggestions, as to treatment, are only intended to induce the patient to follow the directions of the physician more implicitly. But should he feel tempted to try the application without any such assistance, let him remember that the organism itself com-

pletes the healing process by the amelioration of the disease, and that the termination of a disease may be hastened though a cure cannot be extorted from nature. Hence, a patient to whom the manner of the progress of the disease is unknown, and who is therefore unable of his own knowledge to regulate his course of life, should, if the treatment is to be successful, neither carry it too far in one direction nor neglect it in another. The one object to be kept in view is the permanent restoration to health.

As to the choice of the spring, that must depend upon the nature of the disease, the idiosyncrasies of the patient, &c. In diseases where warmth exerts a soothing influence, as in stomach affections, in chronic diarrhœa and in chest affections, there can be no question that it is often desirable to bring the water to the temperature of the stomach, which is about 98° Fah., and this may best be accomplished, where the water is below that degree of heat, by adding hot water or, preferably, in many instances, hot milk. By the addition of hot water or hot milk, the chemical constituents of the waters undergo no change, and none of their healing virtues are sacrificed. But the most suitable temperature is generally the natural temperature of the water, and it is therefore the simplest plan to obtain the desired portion directly from the spring.

Of the water from the spring, a certain quantity—half

glass—may be drank in small draughts at intervals of twenty or thirty minutes; thus the stomach is not overloaded and half an hour after the last glass the stomach will be ready for breakfast. A not fatiguing walk facilitates the absorption of the water. The choice of the spring, the quantity and temperature of the water, whether pure or mixed with milk, or goats-whey, must be settled by the physician according to the age, sex and condition of the patient.

During the warm season the patient may begin to drink at 6 A. M. or even earlier, and continue until 8 A. M. The water is taken before breakfast because this time is favorable to its absorption into the system, and if the stomach itself is affected the influence of the water is more marked. One or two glasses drank in draughts of half a glass at intervals of twenty or thirty minutes, in the morning, is quite sufficient, especially where the functions of the stomach are at all feeble. Should the water disturb digestion, or take away the appetite and thus interfere with the proper nourishment of the body, the quantity must be reduced to half a glass before breakfast, in two draughts at an interval of thirty minutes.

A repetition of the drinking from 11 to 12, and in the afternoon from 5 to 6 is sometimes to be recommended, generally where a minimum quantity of water is taken in the morning. Setting aside the fact that this proce-

dure allows a reduction of the morning dose—to the advantage of the digestive organs—the effects attained are deeper and more permanent whilst the action is less exciting, than if larger quantities of the water are imbibed and again rapidly ejected from the body in the morning hours.

Between the times for drinking the water—that is the intervals of the doses—the patient should take a walk as far as his strength or the complaint from which he suffers will allow, and after the last draught he should walk at least twenty minutes or half an hour. Exercise not only facilitates the absorption of the waters, but is important to the re-establisment of health. Every watering place should be provided with a glass enclosed colonnade, close to the spring and adapted for short strolls, in which the patient could exercise in bad weather, during the time which elapses between the various draughts of water. Very weak people can take the waters in their room until they feel stronger.

In cold or rainy weather, or where the condition of the patient will not permit of his taking exercise, the water may be taken in bed, mixed with warm milk or whey if desirable. In this way many cases are treated with exceptionally good results, especially cases of painful menstruation where the pains are of a neuralgic or congestive character.

If experience has taught us to modify the practice of

earlier days with regard to the drink-cure, when it was not unusual among the Romans in the Twelfth Century to take the waters of Ems to the extent of twelve pints a day, we shall learn that the use of the bath has undergone yet more material changes. In olden days it was supposed that the real efficacy of the water depended upon the length of time the patient passed in the bath; this time was systematically increased, so that the patient remained several, even four or five hours in the bath, repeated it daily, sometimes twice a day, as is yet the custom at some of the watering places in lofty Alpine regions. In most of the bathing places in Europe, however, a modified treatment has become law, and may be said to be the sole guarantee for ensuring the happy results hoped for by physician and patient.

Full and Douche baths are those most frequently used. Vapour baths and compresses of mineral water are less frequently applied, and before using these the invalid should always have special advice.

The effect and good results of full baths depend in a high degree upon the temperature of the water. The patient should therefore be careful to ascertain that the water has the proper degree of heat, for the warm bath may have different effects determined by the temperature of the skin, which is usually about 95° Fah. If the water of the bath exceeds this temperature, heat is conveyed to the body, the heat of which is increased in

proportion to the warmth of the water; whereas on the contrary, water at 90 to 95° Fah., exercises the soothing and curative influence of the bath without creating any injurious excitement. Since rheumatic patients with irritation or inflammation of the joints, and patients suffering from nervous affections of the most diverse character, form a great part of those who use the bath cure, the irritability of the one and the sensitiveness and weakness of the other class render it necessary that the baths should have only a moderate amount of heat. But as the heat of the body varies in different individuals according to temperament, age and physical condition, the temperature of the baths should also vary. A bath which produces an agreeable sensation of warmth in one individual will occasion rigors in another; it is, therefore, necessary to decide in each individual case, according to the sensibility of the patient, what a proper temperature will be. Taking the heat of the body, 98° Fah., as a basis, we divide baths into the *hot bath*, of which the temperature varies from 98 to 104° Fah.; into the *warm bath* of which the temperature varies from 95 to 98° Fah.; and into the *tepid bath*, of which the temperature varies from 85 to 95° Fah.

Baths above the temperature of 98° Fah. should rarely be used, since they are apt to produce prostration and faintness, and to irritate the skin to the extent of causing an eruption, which the French call *efflores-*

cence de bain. Many persons also experience fullness about the head and even vertigo as an effect of the hot bath.

During the period of menstruation the use of the baths should generally be discontinued from five to ten days; but in exceptional cases, where the flow is too little or accompanied by severe pain, the baths may be continued and are often found to be soothing and efficacious. In such cases, however, the propriety of using them should be determined by the physician.

As to women who are *enceiente*, the custom is not to bathe daily, but at intervals of a few days, unless contra indicated by some peculiarity or idiosyncrasy of the patient. Judiciously administered, the baths are found to be not only harmless, but often contribute to maintain pregnancy without accident to the full period of gestation. The contrary effect, however, is apt to be produced by the drinking of mineral waters. Their internal use may easily lead to trouble, and should only be permitted in exceptional cases and then with the exercise of great caution. Indeed, *caute et prudente* is a wise maxim which should be constantly borne in mind by invalids who use mineral waters either internally or externally, as they are potential for evil as well as good results, and, if injudiciously applied, may increase the malady instead of ameliorating it.

The next point for consideration is the *length of time*

the patient should remain in the bath, and the *order* in which he should take them. In most cases the first bath may last for ten to fifteen minutes. During the next few days the length of time may be increased to twenty minutes, and then, if the effect is not found to be debilitating, the time may be prolonged to half or even three quarters of an hour; but twenty minutes will generally be found sufficient, and a bath of longer duration than thirty minutes, far from producing any beneficial result, may debilitate the patient and retard recovery.

Absolute repose in the bath is not essential, except in the case of very delicate persons. On the contrary, slight movement, such as gentle rubbing of the body, is not only admissible but even desirable. At the European baths it is customary to go to bed immediately after bathing, and remain quiet for half to three quarters of an hour. When we consider the effects of a bath this practice would seem to be a very wise one. Repose in bed with suitable covering is the very act by which the beneficial influence of the bath is brought to a climax, and every neglect of the rule will prejudice the result. In thus proceeding the intention is not, as might be supposed, to put the patient into a perspiration, but to continue the soothing effect of the bath and its revulsive influence upon the skin.

Baths may be taken in the morning when fasting, (after drinking a glass of the mineral water) or from

three to four hours after an ordinary meat breakfast. Patients suffering from debility should not bathe when fasting, but it would do well to take the bath from one and a half to two hours after a simple breakfast of coffee and bread.

In conclusion, it may be well to add that much must always be left to the discretion of the medical man, and this irrespective of the demands which the various diseases make upon the patient. To this category belongs, for instance, friction with brushes, &c., a process which should not be conducted without a clear perception of its uses.

The powerful effect upon the body of Douche Baths limits their application to a certain class of diseases. Water of a somewhat higher temperature than the ordinary bath is generally used. The cabinet bath is first completed and then the douche is applied, while the patient is setting on a chair or reclining on a canvas bed. The strength or force of the douche is the main point. It must be strong when it is desirable to produce irritation, especially in the case of painless secretions or enlargements in the external portions of the body. At *Aix-les-Bains* in Savoy, and *Aix-la-Chappelle* in Germany, where these baths are now so well managed and appreciated, some of the douches are very powerful, the pressure rising as high as twenty feet. The stream of water can also be made thicker or smaller as

may be required. In cases of nervous disease—or for strengthening the nervous system generally—when a less powerful stream must be applied, this can be attained by the use of what is known as the rain douche, or simply by turning the stream obliquely upon the part requiring the douche.

The douche lasts from five to eight minutes, or a shorter time when merely a gentle irritation is desirable. It is not generally necessary to take a douche bath every day—nor indeed would such a thing often be practicable. In the case of a strong hot douche bath the skin does not soon recover from the effect, and the irritation of the part should always have passed away before the douche is repeated. Hence it is absolutely necessary that after each application of the douche more complete repose should be allowed the body than is called for after the ordinary cabinet bath.

The duration of the course can only be estimated by the *result*, and this is generally determined by the nature of the disease under treatment. From three to six weeks is considered the average time for the completion of the cure in ordinary cases, but in tedious, deeply-seated complaints, such as are usually found at health resorts, a cure may not be looked for in less than sixty or ninety days.

As a preparation to the douching process, invalids are advised to begin the cure by a few cabinet baths of

the temperature of 95° Fah.. which are to be rendered more soothing by the addition of one or two pounds of starch. This last method is used for reducing nervous or muscular irritability, for mitigating pain, and for calming cerebral excitement, as well as for modifying the effects of the douche. Full baths often increase rheumatic pains, while the douche alleviates them; but taken alternately the effect is often found to be most salutary.

Swimming Baths differ from the ordinary warm baths only in this, that they are taken in a larger body of water, combined, however, with the immense benefit which the patient derives from the motion and exercise allowed by the larger space. This is a form of bath which was highly esteemed by the ancients, and at the present time it is used as a powerful means of alleviating many diseases. The swimming baths of *Aix-les-Bains* have been recommended by eminent orthopedists as one of the best remedies for weakness of the osseous system. They are said to have effected remarkable cures in cases of rickets and scrofula, as well as in affections resulting from rapid growth, debility and suxual excesses. Combined with cold shower baths, they have been found efficacious in certain hysterical, uterine and nervous disorders.

CHAPTER V.

Manner of life during the cure. Necessity for regularity. Exercise and amusements. Late hours. Precautions against taking cold. Simple and nourishing diet. Intervals between meals. Breakfast. Dinner. Supper. Spiritous liquors. Coffee. Important precaution during the cure. Precautions after the cure. The milk cure. The whey cure, &c.

According to the inscription over the Baths of Antoninus in ancient Rome, already alluded to, complete surrender of self to the object in view, namely, restoration to health, can alone secure success. Bathing in and drinking the waters cannot effect a cure if the diet and method of life, and even the amusements, are at varience one with another.

The more regular the plan of life, the less likely is it that the cure will be interrupted. As we said before, breakfast or the bath, with the hour for repose, follows the water drinking. In wet weather the remainder of the morning should be spent at home, but when the day is fine, a walk in the shady promenades may be taken before dinner. The time of the dinner hour is of little importance and can be determined according to custom. The warmer hours of the afternoon are most agreeably passed in the open air in pleasant society; but the patient

should not omit to take more exercise before supper, which must not be eaten too late, lest it should interfere with the night's rest. The object of the walk is to stimulate the appetite and strengthen the body.

As more drinking at 5 P. M. is often prescribed, the exercise accompanying the draught is a good prelude to the walk which may gradually be extended and even, under certain circumstances, renewed after the meal. The evening again may be devoted to amusements, the patient, however, must always carefully avoid whatever may be injurious to him. It will be well to mention particularly that it is unwise to remain too late in the open air. The bather, whose skin necessarily grows more and more sensative, must be on his guard on these occasions. Late hours should be avoided. The old adage, that sleep before mid-night is the most refreshing, probably originated in the periodical changes which the body undergoes.

The numerous avenues and grounds, the walks which stretch out far into the woods, and the well cared for foot paths, found at most American watering places afford many opportunities for strolls, and the methodical use of this powerful auxiliary to the "cure," will be found to bear good fruit. The number and variety of picturesque points in the vicinity of these resorts suggest inviting excursions, and even those who come as patients will scarcely fail to profit by occasion-

ally visiting these places; though it is advisable to devote the earlier part of the stay to the "cure,"—to the alleviation of suffering—and only undertake extended excursions when convalescent.

It is impossible to impress too strongly upon the patient the necessity of guarding against taking fresh cold. This is very apparent when we have before our eyes numerous patients afflicted with rheumatism and nervous pains, who seek relief in the use of the waters. Two things there are which, as already stated, must be carefully guarded against whilst applying mineral waters, namely, *the excessive use of them*, especially by bathing, which renders the body particularly susceptible to cold and is frequently the cause of failure in the treatment. The effect of baths taken even at a moderate temperature is to render the skin more susceptible, hence the patient himself is often responsible for the appearance of fresh pains induced by incautiousness. Again, patients should guard against over-sensitiveness; while the clothing should at all times be *comfortably* warm, too warm clothing will predispose to chill. The sleeping room should always be well ventilated, and if the night is warm a window may be left open, due care being taken to avoid draughts. On cool damp days, or towards evening, or when a fresh breeze is stirring, or when sitting in the open air, or taking a short railway journey, or after the bath when the patient does not

betake himself to bed, but lies upon a sofa without the requisite amount of covering, it is on such and similar occasions that cold is most easily taken.

Constitutional conditions must regulate the Diet, as they must the entire life of the patient and the application of the water. No mineral water, whatsoever it be, can in itself determine the kind of food to be taken. Secondary considerations, which generally originate in a conventional method of applying the waters, may now and then be admissible, but should never be arbitrarily decisive. The diet should be always nourishing, and it is best when *simplest*. Nature herself under all circumstances *completes the cure*. If the organism is to be in a position to restore the interrupted balance of health, its energy must not be permitted to flag for want of proper and nourishing food. The desire for food is generally increased, but as the main object of the use of the waters is not indulgence, but restoration to health, *reason* must regulate the diet!

No less important is it—or rather it is of still greater importance—that there should be a considerable interval between each meal. Accurate observation proves that the stomach requires from four to five hours to digest the quantity of food eaten at a moderate meal, and during this process the stomach remains for a time, as it were, in a diseased condition, which may be compared to a slight inflammation. It is only after the lapse of five or

six hours that it resumes its ordinary healthy condition. Three meals during the course of the day are, therefore, quite sufficient; but this is a matter which must be decided by the state of the patient.

Breakfast should consist of dishes of the same kind as those which the patient has been accustomed to before his arrival; a substantial meal—*dejeuner a la forchette* of the French—is often found to be very advantageous. In all cases of irritation, in diseases of the chest and complaints of the kidneys, etc., the food should be very simple.

Dinner must be regulated by the condition of the patient; he should be careful not to overload the stomach, nor should he eat any great variety of food at any one meal. In doubtful cases it is better to abstain for the time and then apply to the physician for advice.

It would perhaps be as well to mention that sweet dishes, fruit, &c., must be taken with the greatest caution. Anything of a very cold nature is most injurious, such as cold beer, iced water, and—worst of all—ices.

Spiritous liquors of good quality when taken in moderation do not in any way diminish the effects of mineral waters; indeed they often serve as a stimulus to the system.

It has become a common custom to take coffee in the afternoon or after dinner. It is perhaps beneficial to those who are accustomed to it, as well as to those who

have partaken of a luxurious meal. But the ingredients contained in coffee, viz: theine, empyromatic oil and tannin, generally impede digestion.

The nature of the patient's supper should be determined by his sleep. Hours of rest are not to be devoted to such physical labor as digestion, which is unnaturally retarded during slumber.

The process of digestion should therefore be ended before sleep begins; hence it follows that supper should be light and taken early, or, under certain circumstances, omitted altogether.

Under all circumstances the invalid should learn to look upon a regular diet, and simple life as the foundation of health as well as the safest method of overcoming disease.

PRECAUTIONS TO BE OBSEVED BY INVALIDS.

The usual seasons for making use of mineral waters are the spring, summer and autumn; in very chronic cases they may be continued through the entire winter, but are only to be taken when the weather is fine and admits of active exercise in the open air.

Whether mineral water is employed internally by drinking or externally by bathing, the appearance of menstruation in women exacts a modification of its use. In the greater number of cases it is well to diminish the

quantity of water drank, but it rarely happens that one is obliged to stop its use entirely.

It frequently happens that constipation is experienced, generally at the commencement of the cure, which may be corrected by a little Glaubers salts taken in half a glass or a glass of the water before breakfast. Usually one or two doses will cause the constipation to disappear.

If during the cure, it happens that a congestion of the lungs manifests itself by the spitting of blood, the baths must be absolutely dispensed with, and the internal use of the water modified. Those predisposed to this affection should always use mineral waters with great caution. Where symptoms of inflammation of the lungs or violent pain in the side, accompanied by fever and oppression in breathing exist, the use of the waters should be immediately stopped.

In severe acute catarrh or "bad cold" one should, from the beginning of the trouble, cease to take the baths, and drink less of the water. The internal use of the water is also to be forbidden during the existence of diarrhœa, and the bath should be taken less frequently. The same recommendations apply in cases of indigestion.

It very often occurs that warm mineral baths will augment or produce pains in gouty or rheumatic subjects. These are to be considered as the eruption

of a pre-existing disease which may have been for some time latent in the system, and consequently the use of the waters should be continued, as where the disease is openly manifested.

In all cases invalids are strongly recommended before commencing a course of waters, to consult a physician who understands the mode of their application, for some preliminary treatment is generally required, and the action of the waters being often very powerful, it must be carefully looked after.

It cannot be too often repeated that invalids should avoid great bodily or mental fatigue. They should seek diversions the most suited to their taste and indulge in them with prudence. They should wear warm but light clothing, preferably woollen.

The invalid should avoid bringing on too free perspiration. Perspiration is only beneficial when proportioned to the patient's bodily strength. In fact the patient should place all his reliance on the slow and progressive modification of the constitution, which always results from a well-directed water treatment. He should beware of listening to those counsellors who, knowing nothing of medicine, do not take into consideration the age, constitution or any morbid state which the patient may have, and so cause the malady to become more intractable through their officious intermeddling.

Patients who are very delicate and sensitive to cold will do well in not allowing the hair to be wetted in the bath; they may thus prevent cold, earache and tooth-ache.

The patient must be very careful not to allow himself to go to sleep in the bath; if after it, however, he feels sleepy, he may consider it a sign that a sedative action on the nervous system is taking place and that the bodily functions are returning to a state of equilibrium. This is the basis of all remedial agencies.

Although it may sometimes be desirable to have recourse to medicines, they should be taken only when absolutely necessary; the mere change of air and difference in the manner of living on the arrival of the invalid at the springs are of themselves sufficient, in a measure, to act as curative agents. This is more particularly the case when the patient arrives with his organs of digestion already much impaired.

In case of obstinate maladies, for which a long treatment is necessary, it is sometimes beneficial to interrupt the treatment at certain periods. Each period constitutes a "*saison*," and is to be recommenced after a certain interval. In such cases, should the strength and state of the patient allow of it, it will be of great benefit to him to have a complete change of air and scene. He may spend the interval in making some pleasant excursion, or in visiting another watering place.

This must be born in mind, that mineral waters have a specific action through the absorption of their chemical mineral principles; a general purifying tendency by increasing the action of the absorbing vessels and of the secreting functions; a local action on the epidermis and the underlying tissues; and particularly a reaction when applied by means of local douches to parts of the body away from the seat of disease. This is the secret of the sometimes wonderful effects of the waters in a great number of diseases. The effect is the more to be depended upon the more gradually it takes place, as with all slow but sure improvements.

It often happens, as has been already stated, that during the mineral water treatment the sufferings of the patient are increased. But, far from being disheartened, they should take courage and persist in the treatment as long as their medical attendant desires them to do so. In the majority of cases they will be well recompensed for their perseverance; for, although at first the waters may make them worse, it is but the more surely to free their constitutions from the disease.

Inasmuch as every curative means, methodically employed, and the treatment of which it serves as a basis, acts after the cure, so the beneficial effect of mineral waters upon the organism is prolonged for a considerable time after their use has been discontinued. It is important, therefore, not to counteract this ulterior

action by hurtful influences, but to observe carefully for some time the prescribed regime and only return gradually to one's former mode of life, avoiding as far as possible those influences which may have caused the developement of the disease.

The patient should bear in mind that after having undergone the prescribed treatment, the pores of the skin are more open and the exudation from the body more active; he should therefore guard himself against anything which may subject him to the possibility of taking cold, a result which often occurs and destroys the good effects obtained by months of perseverance in the use of the waters. Night travel should be avoided as far as possible, and never undertaken except in warm, dry weather.

It is very necessary for the patient to refrain from his usual occupations, and if possible to lay aside all business matters for a week or two after reaching home. But the best consecutive treatment consists in a tranquil sojourn in the country, with milk diet. In many cases sea-bathing or simply a sojourn at the sea-shore will aid in confirming the cure; and, if their pecuniary resources will admit of it, a climatic cure such as may be had under the warm and pleasant skies of Florida, Southern France, Italy, Spain or Algiers, is to be recommended, especially for patients suffering from affections of the respiratory organs. In cases less grave it

will suffice to take a short sea voyage.

If the stay at the springs has been interrupted or too limited to effect a cure, the patient may continue the drinking of the waters at home, or wherever he may desire, as they lose little of their virtue by transportation, when properly bottled. The best means of preserving the water fresh is to draw it directly from the spring into proper casks or bottles which should be, when full, hermetrically sealed. If it is desirable to drink the water warm, the bottle containing it, after being opened, should be suspended in hot water, or as before stated mineral water may be advantageously mixed with hot water, or preferably hot milk.

The gradual multiplication in late years of milk cure establishments at all European watering places speaks eloquently of the value of milk in conjunction with mineral waters as a curative agent. The pure, gently-acting nutrive components of normal milk offer a most suitable remedy in certain diseased conditions which require, whilst strengthening the body, the exclusion of irritating and exciting diet. For years past the methodical use of milk has been highly recommended in diseases of the respiratory organs, the lungs and throat, in heart disease, in chronic derangements of the digestive apparatus and in cases of extreme nervous excitement. By improving nutrition the milk diet is also most efficacious in anemia and in the furtherance of

developement. In late years the happiest results have been attained by the free use of milk in diseases of the kidneys—especially in Bright's disease.

The whey of milk, a remedy greatly esteemed by ancient physicians, is now much used by the physicians of Europe in connection with mineral waters, especially in cases where the latter would be too irritating.

Whey is a translucent, yellowish green fluid of a peculiar odor. It is prepared preferably from goat's milk by adding a little runnet and curds which take up the cheesy elements of the milk. Besides the water of the milk the principal constituents of whey are sugar of milk, caseine and albumen. A recent analysis gives the following composition:

Sugar of milk	498.1
Fat	3.9
Caseine	20.8
Albumen	19.2
Extractive matter	5.1
Cendres	61.6
	608.6

Whey is highly nutritious, and when taken in large quantities it acts upon the kidneys and bowels. In cases of engorgement of the abdominal vicera it acts as an arterial sedative and modifies the circulation. When mixed with mineral waters it prevents the constipation which is often produced by drinking them, and is, therefore, an excellent remedy for piles. In heart affections,

where the waters are found to be too exciting when taken alone, the addition of a small quantity of whey will generally control the too-pronounced activity of this organ.*

*The first whey establishment at Ems was inaugurated in 1845. In a short time it became popular, and 2,430 pints were consumed annually; in 1854 the quantity consumed was 4,173 pints. This establishment, necessarily defective, was found to be inadequate to supply the demand, and in 1857 a new establishment, much larger and better organized, was erected, and is under the direction of a Swiss expert who also directs the celebrated establishment at Soden, where the preparation of whey is extensively carried on. For the purpose of supplying the visitors at Ems he keeps in the wooded mountains of Neuhausel, near Ems, a large flock of Swiss goats. The whey is prepared at night and furnished fresh to the visitors at the springs every morning. The best proof of the popularity of the remedy is that upwards of 8,000 pints are now annually consumed by the visitors at Ems. The quantity of whey to be mixed with the water is determined by the physician.

CHAPTER VI.

SEASIDE RESORTS.

Sea Bathing as a therapeutic agent. The best season. Manner of taking sea baths. Precautions after bathing. A high surf to be avoided. The time for bathing. Chemical constituents of sea water. Its therapeutic action. Rules for sea bathing, &c.

Swimming baths, whether in fresh or salt water, are a most energetic tonic, and in certain morbid predispositions are perhaps the most powerful means of combatting or modifying disease. But the mineral nature of sea water and the hygienic conditions incident to sea air render bathing on the sea shore much more active as a therapeutic agent than the ordinary fresh or salt water baths. Neither sea baths nor sea air, however, act with the same power in all climates or at all seasons of the year. The best season for sea bathing is at that period of the year when the temperature of the air and that of the water more nearly coincide; or when the external atmosphere is only slightly warmer than the temperature of the water. This usually occurs in the spring and fall months, or from the first of May to the first of July, and from the first of September to the first of October, which is the proper season for sea bathing; since the real object of the bath is to stimulate the organism by immersion in cool mineral water, and subsequently to obtain a gentle

reaction by passing into a temperature somewhat warmer than that of the water. We can readily understand that in very cold weather when the sea water produces a sensation of warmth and the external air a sensation of coldness, an open or exposed sea bath would not be advisable, on the other hand, if the temperature of the external atmosphere should be too warm the reaction following the bath is apt to be too violent and long continued for invalids.

A sea bath may be taken either by immersion or by what is termed effusion, which is the receiving of the wave or surf on the surface of the body. Eight or ten "effusions" are generally sufficient, and the length of the bath should not exceed ten or fifteen minutes,—in delicate persons five or six minutes will be sufficient. Plunging or swimming sea baths are the most agreeable, and the exercise of swimming often adds to the beneficial effects of the sea water; but this kind of bath acts upon the organism with less energy really than the effusion. It is not always well, however, when first entering the water to plunge in suddenly.

It is very important to obtain after the bath complete reaction. Frictions with a dry rough towel or horse hair gloves, and some gymnastic exercise or a brisk walk will generally produce the desired results. A warm foot bath, a stimulant and other artificial means of determining reaction should not be employed except on the prescription of a physician.

Generally it is necessary to avoid bathing when the waves are too high. During a heavy surf the water is rendered more or less impure by the foam of the sea, and the animal detritus raised up by the waves, might be injurious if brought in contact with the surface of the body. When the sea is phosphorescent the bath will sometimes produce urticaria or nettle-rash. The best time for bathing is from 11 A. M. to 6 P. M. Between these hours the air is warmer and the vital power greater, from the fact that food has been taken and these circumstances combine to facilitate reaction. It must be borne in mind, however, that no bath should be taken in less than three or four hours after eating, should the meal be anything more than mere coffee and bread.

Under the influence of change of *regime*, of sea air and sea bathing we often observe an excitation, and sometimes functional troubles produced similar to those which are noticed after the use of other mineral waters, especially the thermal waters. In such cases it would be well to take counsel of a physician as to the propriety of continuing the baths.

The duration of a season of sea bathing may, generally speaking, be said to embrace from twenty to thirty baths, though it may be extended to fifty or sixty baths in certain cases; but it is rarely wise to exceed this number; and not more than one bath per day should be taken without special indications. We may judge from

the foregoing, that sea baths, in order to be taken with advantage, or even without injury, exact considerable prudence and care, and should never be employed by invalids except under the advice of a physician.

Sea water, in addition to a large percentage of chloride of sodium or common salt, contains other minerals in considerable quantities, as the chloride of magnesium and calcium, the sulphates of lime, magnesia and soda, and the carbonate of lime. It is, therefore, a true mineral water, and is valuable in the treatment of many diseases, especially those of the lymphatic and glandular systems. It is particularly servicable in the treatment of scrofula and chronic turburculosis, in progressive atrophy of the muscular system and in affections of the nerve centres generally. It has also been found useful in cases of malarial poisoning and in some of the diseases incident to women.

RULES FOR SEA BATHING.

1. Sea bathing should be continued for at least five or six weeks, at two periods in the year, making June a part of the one and September of the other. By thus allowing an interval between the two courses of bathing, a more salutary change may be effected than if it is persisted in for months without intermission.

2. *The old and delicate* ought gradually to prepare themselves for sea bathing, by previously using *the tepid bath*, at a temperature commencing at 90°, lowered five

degrees each time, and terminating at 65°.

3. Bathing ought not to be commenced until two or three days after arriving on the sea coast; during which it may be advisable to take a moderate dose of some laxative, or a glass full of sea water before breakfast. Sea bathing is attended with risk after great fatigue, as on coming from a long journey; and after the body has been long engaged in any exertion which has produced lassitude, debility or chilliness, and when there is any marked determination of blood to the head or lungs. It is an indispensable rule, never to bathe after having taken medicine, or while under its influence or with a full stomach.

4. The robust and healthy may bathe early in the morning before breakfast; but persons of a delicate or feeble constitution or who are in the habit of dining late, and indulging in the luxuries of the table, ought rather to bathe about two hours before dinner. It is better for such persons to bathe on alternate days, than for many days consecutively. Daily bathing frequently produces lassitude, accompanied by a manifest wasting of the body.

5. It is now a rule in bathing, to avoid going into the water when the body is *cold*, and infirm persons should not use the cold bath without having previously taken some moderate exercise. This doctrine connot be too strongly inculcated. Dr. Currie justly observes, that bathers ought not to wait on the edge of a bath, or of

the sea, until they are perfectly cool; for if they plunge into the water in that state, a sudden and alarming chilliness may supervene, which would not have been felt, had they been moderately warm when they went into the water.

6. Attention should be paid to the nature of the bathing place. A bottom of clean sand is to be preferred. Sea weeds are to be avoided; for they frequently contain pointed shells, which may inflict painful wounds.

7. It has long been considered a useful rule to have the head first wetted, and, indeed, many think it necessary to plunge head foremost into the water. It is asserted that a rush of blood to the head, with all its direful consequences, may take place if this is neglected. This practice, however, has of late been objected to. A sudden plunge is a violent and unnatural exertion, which ought not to be insisted upon *especially with delicate people;* and several of the bad effects which are ascribed to cold bathing, and which have forced many who were anxious to persevere in its use, to abandon it, are supposed to have originated from the effects of this very practice. Plunging headlong into the water, with most people, occasions unpleasant sensations, affecting both the eyes and the ears; and no one should do so who suffers inconvenience from it. Those, however, who feel no bad effects from the practice may persevere in it.

8. The time spent in the water should not exceed a

few minutes. If longer immersed, the body should be kept during the whole time under the surface of the water and in action, in order to promote the circulation of the blood. It is much better to remain completely immersed in deep, than to take repeated plunges in shallow water.

9. Upon coming out of the water the body should be wiped dry with a rough towel, and the ordinary dress resumed. It is more necessary to replace the usual vestments quickly than to be extremely anxious to have the surface of the body perfectly dry, as wetness from salt water is not likely to be prejudicial.

10. After bathing, moderate exercise is necessary to promote the return of the heat of the body, care being taken that it is not violent, nor too long continued.

11. If bathing occasions chilliness, a meal should be taken soon after the bath; breakfast in the morning, in the forenoon some warm soup. Indeed if immersion, instead of being succeeded by a glow on the surface of the skin, be followed by chilliness, languor or headache, bathing should by no means be persisted in.

12. During a course of sea bathing, and when even the warm sea water bath is used, friction with a flesh-brush or horse hair gloves, ought not to be omitted. It may enable a patient to continue the course when otherwise he must have given it up.

BATHING DRESSES.

Bathing dresses should be made of a very open texture so as to freely admit water. They prevent the temperature of the body from being so much reduced, as to render bathing in cold weather hazardous. To strong and healthy men, bathing dresses are not necessary; but to the delicate, such dresses will prove useful. When completely undressed, the body should be wrapped in a large flannel gown, which should not be laid aside till the very moment of going into the water: by this means any chill previous to immersion will be avoided, and that salutary glow, which ought always to succeed bathing, will, in general, be insured.

SWIMMING.

The exercise of swimming is healthy and agreeable; it induces comfortable sleep, even in the hottest weather. Perhaps the pores being cleansed, the insensible perspiration increases and thence may result the refreshing feeling experienced. Those, therefore, who have acquired the art of swimming, should continue to practice it, while they remain in the water; for besides the uninterrupted immersion of the body, the muscular exertion required in swimming tends greatly to keep up the balance of temperature which is lost, if the body be surrounded with a medium which is a powerful conductor of heat.

CHAPTER VII.

DIETETICS.

Mode of living. A sanitary rule. What to eat. Nitrogenous and non-nitrogenous food. Beverages. Dietetic rules. Synoptical tables of allowed and forbidden food.

It is difficult even to prescribe a mode of living to be observed by so-called healthy people, who are really only relatively healthy, in order to preserve or improve their health; but it is utterly impossible to lay down precise rules for sick people, whose individuality as well as their various diseases are to be considered in fixing upon a course of treatment.

The rule generally approved in hygiene, that every one in order to preserve health must adopt that mode of living which, according to temperament and constitution, is most suitable to him, cannot be applied generally to sick persons, because, owing to irregularities in their organisms, they are frequently obliged to adopt a specific mode of living and a certain course of medical treatment. If, therefore, we try to lay down some general rules for the sick, it must be understood that they are to be applied only to those patients who have not received from their medical advisers other directions, which may be more adapted to their individual cases.

In the first place, the patient must look for a Resort which affords him the means of bodily and mental rest, and that comfort which he is accustomed to enjoy. "A quiet, self satisfied temper is an indispensable condition for a successful cure," and how much a well chosen place may contribute to this happy state of mind is known to every one who has once had the misfortune to have selected a place which did not give him satisfaction.

Unhealthy districts, properly speaking, are not to be found at Mountain or Sea side Resorts, but for certain seasons of the year, as well as for certain bodily and mental conditions, the various advantages of different localities ought to be taken into consideration.

For healthy people there is an old sanitary rule: "Never lay aside an old habit suddenly; if it is innocent it may be retained, if it is pernicious it should be left off only by degrees."

Although it is well, as far as possible, to live up to this fundamental principle, there are, however, patients enough with whom an immediate change of their former way of living is absolutely necessary when they visit health resorts, especially those whose habits are diametrically opposed to the rules prescribed for taking mineral waters.

WHAT SHALL THE PATIENT EAT?

The correct solution of this question is, for the patient, of the highest importance. Many patients think by

taking several glasses of water they have paid their tribute to Hygeia and consequently are justified in passing the rest of the day in dissipation, and, especially in regard to eating and drinking, pursue their old sins and bad habits. Many think they have done more than enough, if they confine themselves with regard to the selection of their meals, to those dishes which the physician has allowed them, without considering that the quantity taken is a very important factor in the matter of diet, and that too much or too little may produce as disagreeable consequences as badly chosen nourishment.

What a patient is to eat and to drink, and what he is to avoid in this respect depends not so much upon the water he has taken, because, as a general thing, before he breaks his fast, the water taken has already passed out of his stomach and often his bowels too; and if it has not done so, his breakfast-hour is badly chosen. A rational and beneficial diet can only be prescribed by taking due consideration of the disease and the individuality of the patient; all the rest is of less importance. Every disease produces in the organism peculiarly characteristic chemical and physical changes; now, as these abnormities on the one hand must necessarily be increased and aggravated by an injudicious diet, it is on the other hand, frequently in the power of the physician, to counteract these obnoxious formations, or at least to

promote their excretion by a rationally chosen diet. These points of view can, therefore, alone be taken into consideration with regard to the proper diet.

As it is of importance during the drinking of the waters to eat only food which is easily digested, we have for the greater convenience of the reader selected a table of such food as is generally prescribed, according to its greater or less digestibility.

The first column contains such food, as is most easily digested and ought to be considered first in making up the bill of fare. If this should be deemed insufficient and the state of the patient should allow more variety in his meals or make it even desirable, the articles in the second column may be allowed; those in the third column, however, are absolutely prohibited, on account of their indigestibility.

Concerning the classification of food for our purposes, it must be observed that various diseases coming under treatment, such as gout, the so-called uric-acid-diathesis, etc. owe their origin to the too frequent consumption of nitrogenous food, consequently the use of such food must be limited, and if possible entirely prohibited and replaced by other nourishment. Starting from this practical point of view, we class the food in the following manner.

I. NITROGENOUS.

1. Albuminoids; albumen, fibrine, globuline, caseine,

gluten, and legumine.

They are found:

a. in animal food:

milk, eggs, meat, blood, the brain, liver and some glands;

b. among vegetables; the various kinds of grain and vegetables.

They serve as substitutes for the albuminoids in the organism.

2. Glutinous substances.

They are produced by boiling the glutinous textures, such as bones; cartilages, sinews, etc.

II. Non Nitrogenous.

Of importance to us we mention:

1. The neutral fats in milk, butter, in rich cheese, the liver, brain, oleaginous plants, etc;
2. The so-call hydrates of carbon:
   a. various kinds of sugar (cane-sugar, grape sugar, sugar of milk.)
   b. various kinds of starch and dextrine in many roots, potatoes and seeds of the various kinds of grain and legumes;
   c. mucilagenous substance in various bulbs and seeds;
   d. cellulosa in the various kinds of cabbage.
3. Pectine-matter, the gelatinous parts of fruit and various roots.
4. Organic acids, especially in fruit.

Nitrogenous Food.

A. Animal diet.

The most customary and, in general, most palatable, nourishing and digestible of all this class is meat, especially the muscular tissue. It is most easily digested when it comes from animals not too young, for instance from two year old beeves, one year old sheep, and chickens about six months old. With increasing age the meat of the animal becomes tougher, harder to digest, and consequently less nutritious; if taken from too young animals, however good it may be, it has, notwithstanding the opposite opinion of various authors, very little nutritious value and is harder to digest, because in too young animals the glutinous substances preponderate. It is therefore not advisable for sick and convalescent people to eat any such meat. The meat ought moreover not to be eaten immediately after killing, as it is then very tough and consequently not readily digested. This fault can be easily repaired by keeping it for some time in winter exposed to the air, and in summer on ice, but it should never be allowed to freeze.

The advantage of this proceeding is to be found in the circumstance, that the lactic acid formed during the process of decomposition dissolves the lime in the fibres, which then become more tender, and more accessible to the chyle. Meat for invalids ought not to be too fat, lest it should affect the stomach. It must be quite lean

for patients who are on strict diet, because it is then less nutritious and does not assist in the formation of fat. In regard to fat, the meat of fowls and pigeons contains less than that of any other domestic animals: next comes that of the ox, of the calf, of the sheep and last that of the pig.

Concerning the forms in which meat is consumed, raw meat, well scraped with a little salt or a few drops of muriatic acid or lemon-juice, tastes well, is tender, nutritious and fit for the weakest stomach. The reason for this may be that thus prepared, hardly anything but the juice of the meat is obtained, which represents a concentrated solution of albuminates in a form that is most easily digested.

If not scraped, raw meat is pretty tough, therefore it must be boiled or rosted, as by these processes it becomes more tender and to most people more palatable.

Boiling and roasting should not be continued too long, because then the juice of the meat is extracted and it becomes tough. In general, slightly roasted meat is preferred to meat slightly boiled, in prescriptions for the sick and convalescent; but there are patients who prefer slightly boiled meat both as regards flavor and digestion to that of roasted meat. In such cases there is no reason to force them against their inclination.

Pickled and smoked-meats ought in general not to be given to sick and convalescent people, as the meat is

made tough by pickling and thereby loses about half of its nutritious quality, while by smoking the fibre shrinks and becomes hard. If, however, it is desirable to prescribe salt-meat the best suited is raw smoked ham; frequently the weakest stomachs will bear this meat better than any other, and it seems particularly indicated, if an entire want of appetite and inability to digest has taken place in consequence of the stomach being weakened by a protracted use of medicines.

Meat soaked in vinegar and roasted is not to be absolutely rejected, if the process of soaking has not lasted too long; it is, moreover, not advisable to add the usual strong spices.

Beef-soup, broth or bouillon is likewise an excellent and easily digested nourishment, if it is strong. Thin bouillon relaxes and weakens the stomach, therefore, it should be made more nutritious and stronger by adding to it certain substances from the animal as well as vegetable kingdom, The additions from the former consist of slightly roasted and then finely chopped meat of various game, poultry, various amphibia, the hind-legs of frogs, and various mollusks, among which oysters are undoubtedly the most prominent. Besides these there are soups made of liver, brain and eggs or of sweetbreads, which can be highly recommended. As a means of improving simple bouillon, which is very much in use now-a-days, we must mention the extract of meat.

Although this is devoid of albumen and the glutinous and fat substances of fresh meat, it must still be designated as a very valuable nourishment. It is easy to digest and improves the taste of many dishes, in which quality it surpasses all other substances.

The following may be mentioned as the principal additions to soups from the vegetable kingdom: rice, barley, oats, grits, sago, tapioca, potatoes, etc., all of which will be mentioned hereafter in their respective places.

In order to prepare a good broth for invalids, it is not advisable to do too much of the good thing, by boiling the meat to shreds. The broth becomes thereby certainly fatter and richer in gelatine, consequently stronger, but it is harder to digest. The kinds of meat consumed by man are so manifold, that it is impossible to enter here into a detailed account of their value as regards nourishment and digestibility. We have only to deal with those kinds of meat which come upon the table of the sick and convalescent, and we will mention them now in as short a manner as possible. The principal among them is undoubtedly:

1. Beef. The form in which it is easiest to digest, most nutritious and palatable is

   a. Beefsteak prepared according to the English method, that is underdone. Of not quite the same value, but still much to be recommended,

and as we have seen before by some even preferred to roast-meat, is a tender piece of

b. Boiled beef, provided it is so prepared that all the juice and strength has not been extracted. By adding a few drops of good vinegar it becomes still more digestible.

c. Roasts, prepared in the usual way are very nutritious and easy to digest; these too must not be overdone.

d. Beef soaked in vinegar and afterwards roasted ought to appear as seldom as possible on the table of invalids, but if it has not been soaked too long it need not be excluded altogether.

e. Beef tongue, not too much salted and smoked, is healthy and easy to digest. The root of the tongue and the tip of it is most desirable for patients. Tongue in jelly is specially to be recommended. The heart, liver, the kidneys and the brain ought not to be given to sick people.

2. VEAL is less nutritious than beef, but easier to digest, *provided it is not too young*. Everybody knows that veal, when it is too young, disagrees more with the stomach than beef. The breast and loin of veal are considered the best pieces to roast for convalescents. Likewise are to be recommended:

Veal-cutlets, ragout and calf's-tongue.

Sweet bread has long and justly been consider-

ed by physicians as an extraordinarily nutritious dish, very easy to digest. It is prescribed in the shape of soups or stewed in butter or boiled with a light, nice gravy. Less to be recommended are the heart, liver, kidneys, and boiled calf's-head.

3. MUTTON. Its nutritious value and digestibility correspond in general with those of beef, although it is not quite equal to it. For the dietetic table we can only recommend:

   Roast mutton, mutton-chops and leg of mutton, the latter slightly soaked in vinegar or in beer for 48 hours or even more, without being salted previously. Instead of vinegar the meat may be soaked in Claret from 6 to 14 days according to the season.

4. PORK ought to be excluded under all circumstances from the table of the invalid being altogether too fat. If for special reasons it is to be prescribed, raw smoked ham is the only form to be allowed.

5. GAME, (hare and deer,) is very much to be recommended for the dietetic table, provided the meat comes from young and fat animals.

6. POULTRY.

   a. Wild fowl, in regard to its nutritious value, is preferable to tame fowl; it has a finer flavor and is easier to digest. But as it contains a good deal of albumen it must be forbidden to those suffering of plethora, gout and hœmorrhoids. We

recommend for the dietetic table: partridge, prairie chicken, wild pigeons, snipe, woodcock, etc.

Forbidden,

a. because they are too fat:
quails, larks, ortolans, geese and wild ducks;

b. because they are too hard and dry:
the black or mountain cock, pheasents and all old poultry.

b. Tame fowl is, in spite of the albumen contained in the grown specimens, less nutritious than wild fowl. Meat of young poultry contains less albumen but more glutinous substances, and is therefore eminently fitted like young veal for plethoric and gouty patients, and those suffering from hœmorrhoids. Chickens, pigeons and turkey are recommended.

Goose and duck are prohibited on account of their fat, which is hard to digest.

7. Fish.

Of Fish, as a dietetic dish, the following must be observed.

a. The meat of fishes is not as nutritious as that of the animals mentioned so far, but contains a good deal more fat.

b. The meat of fishes of prey, such as pike, trout,

etc., is better than the meat of those living on vegetable matter and mud.

c. Scaly fish are generally more easily digested than those with a smooth skin.

d. Sea-fish in general are more nutritious than fresh water fish, but they are much richer and therefore harder to digest.

e. Fried fish is harder to digest than boiled. The latter ought therefore to be preferred for the dietetic table.

Perch, mackerel, rock, pike, trout, sheeps-head, sole and haddock are to be recommended.

In regard to digestibleness, the following are less advisable, but need not be absolutely prohibited:

Eel, fresh herring, anchovy, sardines, cod fish, flounder.

Prohibited on account of their richness, are:

Carp, shad, salmon, salmon-trout, mackerel.

The roe of salted fishes, is allowed, being nutritious and pretty easy to digest. It serves also as a stomachic, creating appetite, but ought only to be taken with dry bread and in small quantities.

8. AMPHIBIOUS ANIMALS.

Turtle, very fat and hard to digest, therefore prohibited. Hind-legs of frogs, very nutritious

and easy to digest, therefore warmly recommended.

9. CRUSTACEOUS ANIMALS.

Fresh-water craw-fish, Lobster, Crabs and Shrimps. The meat of these crustacea is hard and not easy to digest; its consumption frequently causes nettle-rash, therefore it ought to be banished from the dietetic table.

10. MOLLUSKS.

Oysters and mussels are very albuminous and therefore when taken raw very nutritious and cannot be too highly recommended. Every form of cooking them impairs their dietetic value.

11. EGGS.

Are a healthy, strengthening and digestible food, especially when raw or soft boiled, and they are therefore considered as one of the most efficacious dishes in cases of poverty of the blood, and general weakness. Their combination with broth or wine is to be recommended if a patient shows an antipathy to taking them raw. They are an excellent substitute for milk, if the latter disagrees, owing to the formation of acidity in the stomach and bowels.

Albumen coagulates at 167° Fah., therefore eggs ought not to be boiled at a much higher temperature and hard boiled eggs ought not to be taken at all.

The best dishes for our purposes are:

a. Raw eggs without any addition, or beaten up

with a little pepper and salt, or Cognac in special cases, or milk, or beer.

b. Soft boiled eggs.

c. Poached eggs on dry toast.

d. Scrambled eggs with a little milk and fried in very little butter.

e. Omelet without flour.

Eggs fried on the plate are not recommended to sick persons, owing to the albumen being entirely coagulated.

12. MILK.

According to its chemical combination, milk consists of water, caseine, albumen, and some other azotic substances which are not well known, finally of sugar of milk and fats. Of mineral substances the following have been discovered: Chloride of sodium, chloride of potassium, phosphate of lime and magnesia, likewise iron. Of gases it contains only carbonic acid. This chemical combination, so much like our blood, shows how invaluable milk is to the organism as a nourishment; but it would be a hasty conclusion to imagine, that milk is favorable for everybody under all circumstances. In this regard experience has shown, that there are people with whom it agrees very well and others with whom it disagrees completely. But even to persons with whom it agrees well, milk cannot be given for any length of time as their sole

food, for it frequently exerts a relaxing influence upon the bowels.

If milk is to be applied as a healing agent, it must not be boiled as it loses thereby in nutritious value, by the separation of albumen and the loss of carbonic acid, which makes it less palatable and harder to digest.

The best milk is obtained from cows that are fed on dry food, especially good hay. The milk becomes less rich and for infants even unwholesome, if the cows are fed on green food such as grass, clover, etc., or on ruta-bagas and other roots.

Milk is therapeutically prescribed in cases of poverty of the blood and general debility, and in all diseases occasioned by them, if we wish to apply a substance which is easily, quickly and without irritation assimilated, and as nutritious as possible. It is therefore used, for instance, in chlorosis and other cachexies, in prostrating diseases of the lungs and bowels of long duration, in losses of blood, spermatorrhoea, and in convalescence.

The most important products of milk are:

a. Whey.

Whey consists of water, salts and sugar of milk, therefore it has lost much of its nutritious property, especially the azotic principle, and is consequently unfit in those diseases where strength-

ening of the organism is to be brought about. It can only find a rational application in cases of congestion, plethora abdominalis, gout, etc.

If in cases of tuberculosis, scrofula and chlorosis where it is desirable to promote nutrition and improve the blood, milk instead of whey must be resorted to.

b. Clabber or sour-milk is easily digested by most people, besides being, in summer, very pleasant and refreshing.

c. Curds do not lie heavy on the stomach and may be taken without injury.

d. Butter-milk is easily digested and has some nutritious value, containing still some caseine in small particles and in a curdled state. Patients with chronic stomatitis according to Kruckenberg — "ought to eat it whenever they are hungry and drink it whenever they are thirsty."

e. Butter is the mildest, pleasantest and most wholesome fat and of all others the easiest to digest. Melted butter becomes more indigestible. Fresh butter may be given to all patients in moderate quantities, except to such as are not allowed any fat at all.

f. Cream, which besides fat contains particles of cheese and whey, seems to lie heavier on the stomach than fresh butter, at least it disagrees

with some people who digest butter very well. At all events it is judicious to be very moderate in consuming it while taking the waters.

g. Cheese. Containing caseine has a not unimportant nutritious value, but is difficult to digest and ought to be prohibited. The worst of all is rotten cheese which often cannot be taken without danger.

13. GELATINOUS FOOD.

Gelatine does not occur as such in the organism, but is formed by boiling glue-producing textures, such as bones, cartilages, sinews and cellular textures. Opinions differ concerning its nutritious value. Most authors are of opinion that it is destitute of nutritious qualities.

According to Bischoff and Voigt gelatine and gelatine-producing textures are transformed into urea. In so far as it prevents the consumption of azotic substances, i. e. the change of matter in the muscle when at rest, it deserves to be classed amongst the nutriments, even if it is not capable of replacing the loss of muscular substance.

In the preparation of gelatinous dishes calves-feet, pigs-feet, calves-heads, ears, etc. are mostly used.

As we have seen above, all textures of very young animals are exceedingly gelatinous, and so are snails.

These substances are served up in the form of jellies, etc.

There are jellies with and without acids, the former if not too acid, being a very wholesome and refreshing food in cases of fever, the latter being easy to digest, even in bad cases of acidity of the stomach.

If jelly is to be served with meat, only such kinds ought to be selected as are allowed for the dietetic table.

All the food mentioned so far is derived exclusively from the animal kingdom and contains, as we said above, azotic or proteine-substances. They seem to owe their chief nutritious value to the albumen and albuminoids which they contain.

Meat is justly considered as the most important food of man, for in the same degree, in which carnivorous animals surpass herbivorous animals in energy and strength of muscle, so do people who eat meat, surpass in bodily strength and mental advantages those of the human race, who live, like the Hindoos on vegetables exclusively.

The meat of the warm blooded animals, to be taken into consideration here, contains nearly all the substances, which are necessary to build up and maintain our organism, in an easily assimilable and digestible form. It is therefore therapeutically applied:

1. In all diseases caused by loss of blood or debility,

during convalescence after protracted illness, in chlorosis, tuberculosis and other cachexies, amongst which the most interesting to us are scrofula and rhachitis.

2. As the substances belonging to this class do not produce fat, the food for an effectual treatment of obesity ought to be selected from them. As a matter of course the meat must be lean, or the fat taken off.

3. These substances must form the food of old age, because, on account of disorganization of the glands (which chiefly have to digest the amylaceous substances) the latter can no longer fulfil their duties.

As the consumption of this kind of food produces an excessive formation of blood, it is to be prohibited in general plethora, where a vegetable diet is preferable.

All substances of this class, gelatine included, form urea in the blood and are therefore to be prohibited in gout, and the uric-acid diathesis. At all events the consumption of meat ought to be restricted to once a day and then only when prescribed by the physician.

B. VEGETABLE DIET.

We will turn now to the second great group, the vegetable, and consider first those containing

14. STARCH.

On account of the amount of nitrogenous matter contained in vegetables, such as gluten, legumine and albumen they somewhat resemble animal food, while, on account of the great quantity of starch they contain, (the most important constituent of vegetable food,) they must be considered as the chief representatives of the non-nitrogenous class. The importance of azotic substances in regard to their nutritious value has been explained already in the remarks on animal food; and we shall now enter into an explanation of the importance of starch, and the hydrates of carbon as food for the organism. It is essential and important to know, that this class of food chiefly produces fat.

Starch is by means of the saliva, the secretion of the pancreas and the chyle, rapidly changed into dextrine and afterwards into sugar, in which form it is absorbed into the blood.

Under normal circumstances no fermentation of lactic and other acids takes place in the stomach, but if this organ is sick or acid, then fermentation takes place with a portion of the sugar, and heart-burn occurs with other disagreeable consequences, all known as the usual accompaniments of a disordered stomach.

For the economy of the organism sugar is of the

greatest importance, and is not only introduced by saccharine food, but is also the product of the action of the liver.

In the blood it goes through a very rapid process of oxidation and is then changed into carbonic acid, during which chemical process a great deal of the heat necessary for the existence of the organism is produced.

Its property, as well as that of the other hydrates of carbon, to produce fat, cannot be doubted after the experiments made in this direction. It is an indisputable fact, that negroes on the sugar-plantations, who, during the pressing of the juice, live almost exclusively on it become very fat. According to the observations of Huber and Gundlach, bees fed on sugar or clarified honey, are said to be able to produce a large quantity of wax. Sugar with the other hydrates of carbon and fats belong to the so-called "Respirations-mittel" of LIEBIG; i. e. that group of substances which are principally decomposed by oxidation, and consequently produce a greater amount of heat than would be the case without their presence. Now as the task which they accomplish, need not be done at the expense of the muscles, and as therefore the oxidizing influence of the inhaled oxygen upon the muscles is diminished by the hydrates of carbon and fats, it necessarily

follows that they limit the consumption of the nitrogenous substances of the body and, consequently, may be considered as nourishments in the full sense of the word.

The lactic acid, which under peculiar circumstances is formed in the stomach, but ordinarily always in the duodenum and small intestines is a most important means for the digestion of azotic food, by which its nutritious value is considerably increased.

Finally, concerning the digestibility of starch, it is with difficulty transformed into sugar in a raw state, more easily when boiled, but most easily when roasted. And as it is changed by dry heat into dextrine, it is therefore most easily digested in this form. For this reason rusks are more easily digested, than they would have been before toasting, and toasted bread is easier to digest than common bread. For the same reason, fried potatoes are more easily digested than boiled ones.

Of all nourishments produced from vegetable substances those of a farinaceous nature are the most important and the foremost of them is

BREAD.

As we have already seen the nutritious value of cereals, besides the starch they contain, depends upon their azotic combinations, and amongst them

chiefly gluten. This is so much more the case, as the amount of phosphates depends principally on the presence of gluten. Now, as bread which contains but little gluten, contains likewise less phosphates and therefore contributes little to the formation of the bones and the maintenance of the activity of the muscles, good bread ought to contain as much azotic substance as possible. After careful examinations it has been proved that gluten is chiefly found in the bran, and that consequently this furnishes a more nutritious bread than the finely ground flour cleaned of bran. The former has the additional advantage of preventing the conglomeration of the bread in the stomach whereby indigestion may be avoided.

Rye-bread has a very fine flavor and has the general reputation of being more strengthening and nutritious than any other bread. We will leave this undecided; it does not agree with the scientific appreciation of the nutritious value of various cereals. For as it is known that wheat contains more gluten than any other kind of grain, according to our scientific views wheat-bread ought to be the most nutritious. At all events people who live on rye-bread generally enjoy an excellent digestion and their stomachs are not inclined to the formation of acid. In order to come up to all the requirements of healthy

food bread must be light, well baked and not quite fresh. All pastry containing much sugar or fat, such as sweet-meats, cakes, tarts and pies, is strictly prohibited from the sanitary table, because, owing to its indigestibility, it may disorder the stomach and produce heart-burn. Biscuits prepared only with sugar, flour and the white of eggs, and likewise those of English manufacture, which contain even less sugar than those made in America, may be allowed if necessary.

Pastes made up with water, such as maccaroni, vermicelli, puddings, etc., are strictly prohibited.

Farinaceous food prepared with milk, such as milk-rice, grits in milk, barley boiled in milk, etc. are allowed.

Of the greatest nutritious value are those substances containing starch, which are put in soups especially in bouillon.

The most nutritious of them are the ripe seeds of leguminous plants such as beans, peas and lentils. They quite surpass the cereals in this regard, are not as hard to digest as is generally supposed, and if carefully passed through a sieve, may even be admitted to the sanitary table.

Of cereals to be put in soup the following are chiefly recommended: Grits of barley and oats, peeled barley, grits of wheat, specially recommended,

millet and rice. The latter contains the greatest amount of starch and the least of gluten and is therefore specially fitted as food for lean persons. Of other vegetable substances we may mention in connection with the foregoing, arrow-root, sago and tapioca.

II. Non-Azotic Food.

15. Vegetables.

As they, on an average, contain only 10 per cent. of solid substances while the rest is water, it is easily understood that the nutritious value of even the most nutritious vegetables is relatively very small; we will therefore, in selecting them for the dietetic table, look more upon their digestibility and their flavor, than upon their nutritious qualities.

They contain traces of albumen, sugar, dextrine and salts, besides various acids, and some of them also a volatile oil.

In judging of the digestibility and nutritious value of vegetables one cannot be far out of the right track, when adhering to the old rule: "All vegetables growing in the ground are more easily digested and more nutritious than those growing above it."

The acids contained in the vegetables assist in digesting the albuminates and fibrinous substances;

therefore meat taken with some vegetables is more easily digested, than if taken without any. In consequence of a greater amount of acid contained in some vegetables, they have the property of increasing the secretions of the bowels.

Acrimonious vegetables like radishes, horse-radish, leek, onions and garlick irritate the channel of digestion too violently and are therefore not to be recommended for the sanitary table. As vegetables in general contain little or no fat, their taste and nutritious value can be improved in cooking, by the addition of fat, best of butter or broth, An addition of flour, which is customary in some places, is not advisable, as it diminishes the digestibility and spoils the taste. According to WIEL the following preparation is the most advisable:

Simple boiling in hot water, then chopping fine and serving up with butter or broth.

Considering next those vegetables growing in the ground we meet first with the most important of them, the potato.

The potato owes almost its entire nutritious value to starch, the easiest digestible form of which is found in the potato.

We have seen above that starch by being exposed to dry heat (roasting) changes into dextrine and then

into sugar, and we know that in this form it is readily and easily absorbed into the blood; therefore potatoes roasted in the ashes or fried are most digestible. Unfortunately the former mode of preparation is not very frequently used. The most usual manner resorted to is boiling them in hot water or steam.

To prepare them for this it is advisable to put them in cold water previously, in order to extract the acrimony peculiar to them. As in the process of digestion, starch is more readily transformed into sugar when fat is added, potatoes ought never to be eaten without some butter, a thing which is happily done instinctively by most persons.

a. Mashed potatoes (puree de pommes de terre) boiled with milk, are most nutritious and most easily digested.

b. Potatoes, a la maitre d'hotel, boiled with broth.

c. Boiled, peeled or with their skin; they must be taken with butter and be well masticated.

Carrots contain much pectine and sugar, and are easily digested.

Turnips are inferior to the former in nutritious value and likewise easily digested.

Celery is coarse in fibre, but easy to digest and is supposed to be very nutritious.

Salsifry and rampions if only one year old are easy

to digest, tender and well fitted for the dietetic table.

Horse-radish, boiled in milk or broth, taken with beef, is easy to digest and recommended. Grated raw and with the addition of some white wine and sugar, it is highly appreciated by many invalids of sluggish digestion.

Young asparagus is one of the most famous vegetables for the dietetic table, if proper care is taken not to eat it with rich sauces. It is best, to take it with some melted butter.

Sprouts are taken in a similar way.

Radishes are very hard to digest and ought not to be given to an invalid under any circumstances.

Of the vegetables growing over-ground.

Spinach and orach (atriplex hortensis) as long as they are young, most suitable for the dietetic table.

Dandelion (Taraxicum officinale,) is unfortunately not sufficiently appreciated as a vegetable. Of course it can be eaten only in spring, as later the leaves become hard.

Then follows

Endive (Cichorium endivia) and

Common Lettuce (Lactuca sativa) another tender and excellent vegetable.

To the class of leguminas, which we have treated of before, we must add another excellent vegetable; we mean the marrow and other peas when the seeds

are quite young; but when they are half grown, they are only fit for our purposes in the form of puree (passed through a sieve.)

To the vegetables, which are easily digested belongs finally the

Artichoke. It may be recommended to those, who wish to regale themselves once in a while as a reward for their self-denial.

Harder to digest and causing flatulency and therefore to be avoided are:

All sorts of cabbage such as white cabbage, Brussels sprouts, red cabbage, kale, curled savoy and cauliflower (in spite of the opposite opinion of some authors.) More preferable is Sourkrout as this has been rendered tender by the process of fermentation and because the lactic acid produced during this process is promotive of digestion.

The following are to be avoided:

Sorrel and rhubarb, and fruits of a vegetable character.

Pumpkins, vegetable-marrows and cucumbers.

Salads are generally forbidden to those taking mineral waters. For others, who do not take them, and are to observe light diet, the following might be allowed at their meals: Salid of endive, of watercresses, of purslane; besides these, salad of asparagus,

of sprouts of the hop-plant, of salsafry and celery.

Raw fruit with which we will class also nuts, filberts and chesnuts are very agreeable but hard to digest and, except the latter, almost without any nutritious value. It does not agree at all with mineral water and may consequently be passed over without any further remarks.

Mushrooms are very nutritious but hard to digest and ought not to be eaten by people taking the waters.

To make the dishes more palatable various substances are added, such as fats, oil, sugar, salt, vinegar, mustard and spices.

16. FAT AND FAT OILS.

Are hard to digest and agree only with a healthy stomach if taken in small quantities. Invalids ought to avoid them entirely. If taken in large quantities, they stop the digestion and cause, by going through an acid fermentation, heart-burn and gastro-enteritis.

If the attending physician finds it desirable to allow fat to certain patients, fresh butter deserves the preference. It tastes more agreeable, is the easiest to digest, as we have seen before, and therefore best fitted for the sanitary table. Rancid butter, as all other rancid fats and oils, is unhealthy.

All rich dishes such as larded roasts, rich gravies, and all vegetables prepared with much fat are injurious and ought to be avoided by persons taking the waters

17. SUGAR.

Is found in various fluids and tissues of the body. In regard to its importance upon the change of matter it belongs to the previously mentioned "Respirationsmittel" of Liebig, and is in this sense also a nutriment. Its principal function in the organism seems to be the production of heat and fat. Taken in small quantities it is easily digested; in larger quantities it is injurious to the stomach, producing acidity. In diseases of the stomach, where a strong inclination to acidity prevails, the consumption of sugar ought to be interdicted. The same observations are applicable to honey.

18. COMMON SALT.

Chloride of sodium does not alone improve the taste of our food but it is an excellent digestive. When taken in proper quantity it exerts a beneficial influence upon the bowels, causes an abundant secretion of chyle, increases the peristaltic action and promotes digestion. If taken in excessive quantities it causes gastritis and if continuously taken thus, may lead to serious disturbance of the general health.

19. VINEGAR.

If taken in small quantities, assists in digesting the albumen, and therefore pickles or other acids may be taken with meat and dishes made of eggs. It does not however agree well with mineral waters. If vine-

gar is added to a dish, it should be done only after the food has been cooked. If taken in too large quantities it brings on gastritis and its consequences. Acid of lemons is of the same nature.

20. SPICES

Are substances which contain a considerable quantity of essential oil, and are consequently of a strong aromatic smell and taste. In moderate quantities they are used to flavor food and may be considered as digestives, because they slightly irritate the stomach and bowels, and promote the secretion of the gastric juice. Taken in excessive quantities they injure the stomach. The greatest number of persons suffering from diseases of the stomach and bowels belong to the upper classes, and are indebted often to the immoderate use of spices for their maladies. It is certain that a great number who suffer from hœmorrhoids, owe the origin of their trouble to the excessive use of strong spices.

BEVERAGES.

21. COFFEE.

The principal ingredients of coffee are:

a. Caffeine, which, in large doses acts as poison, in small doses however it is a nerve stimulant:

b. An essential empyreumatic oil, which seems to retard digestion, and when taken in large quantities, produces palpitation of the heart, acceler-

ated pulsations, trembling of the muscles, perspiration and sleeplessness;

c. Tannin. This diminishes the secretion of the stomach and bowels.

d. Gluten, albumine and legumine, which belong to the class of azotic foods.

The total action of these factors in the coffee-decoction, prepared in the usual manner, is according to Dr. Julius Lehmann (Annals of Chemistry and Pharmaceutics, August and September, 1853,) the following:

1. "It augments the activity of the vessels and the nervous system and retards the change of matter considerably."

2. "It excites the action of the vessels and nervous system, and thus its most valuable action is to refresh the mind, relaxed by over-exertion, to give it greater elasticity, and to produce a general feeling of comfort and cheerfulness."

Why coffee and tea are generally used, is probably owing to the fact that these two beverages have a much less injurious influence upon the organism than spirituous liquors, and possess, at the same time, a peculiar effect upon the nervous system different from that of the latter. While the mind and the imagination are enlivened by the combined action of caffeine and the essential oil, and man, after taking

tea or coffee, is better fitted for mental exertion; spirituous liquors act chiefly by stimulating the imagination, and, when taken in excessive quantities, produce a confusion of thought and an over-irritation of the nervous system which brings about general debility.

As a general rule, patients may take tea and coffee in moderation, but gouty patients must not take either of them.

22. TEA.

As its chemical combination is analogous to that of coffee, its action upon the organism is naturally similar to it. The excitement produced by it, however, is said to be more agreeable, the flavor more pleasant, the taste finer. According to Wiel's graphic language "tea is but the nobler brother of coffee."

23. COCOA AND CHOCOLATE

Are not so exciting and enlivening as tea or coffee, and are very easy to digest. They may be allowed to all taking the waters, except such persons as are suffering from obesity. Directly after meals neither tea, coffee or chocolate should be taken.

24. SPIRITUOUS LIQUORS.

Alcohol is the principal element of this class of food. To this it owes all its good qualities when moderately taken, and all its disadvantages, when taken in immoderate quantities.

By a moderate consumption of alcohol the secretion of gastric juice is increased, consequently the digestion, especially of azotic food, is promoted. This promotion of the process of digestion is however, limited by various constituents contained in certain beverages, for instance by tannin in Claret, and the bitter principle in beer.

Beer may, under certain circumstances, be allowed to persons who are suffering from chronic gastritis with formation of acids.

Claret to those who are inclined to acidity and diarrhœa.

White wines, where it is desirable to have the laxative action of the waters assisted.

If taken immoderately, alcohol ruins digestion completely; it excites the circulation and blunts the nervous system, produces palpitation of the heart, nervous trembling, and finally delirium tremens.

It promotes the formation of fat and assists in the fatty degeneration of the organs.

We may deduce from the above, for the benefit of our patients, the following rules concerning wine and beer:

1. The taking of wine and beer in moderate quantities, is not absolutely prohibited while taking the waters.

2. It is safer for the patient to select his beverage according to medical prescription.

3. The beverages which are allowed must be pure, well fermented and light. As such, pure, well fermented Lager beer, light wines, from the Rhine, the Moselle, the Palatinate and the Hardt, and, under some circumstances light Bordeaux may be recommended.

All heavy wines, such as Burgundy, Malaga, Sherry, Madeira, Port, etc. are prohibited.

It needs scarcely to be mentioned, that brandy and whiskey are generally prohibited.

4. The beverage allowed by the physician should never be taken immediately after the waters.

We have tried to classify food according to its nutritious value, its digestibility and its physiological action upon the organism; it remains now to indicate to the patient those points which he must observe if he desires to derive the greatest possible benefit to his health from the food allowed him. Various classes of patients congregate at watering places, who according to their maladies sometimes have to follow exactly opposite dietetic rules. Every patient ought to convince himself, from this circumstance, how important it is to be duly informed on this subject by his medical adviser; he must consider the following rules as a general guide only, which in detail require many

changes and additions according to the requirements of every special case. Most visitors at watering places belong to that class of sufferers, who by high-living have brought on their malady; we mean those suffering from obesity, from hœmorrhoids, from gout and from plethora. These must at all events, submit to certain restrictions in their diet.

The following bills of fare are recommended.

I. *Order of the day and Bill of Fare for patients suffering from obesity.*

The hours for taking the waters in spring and autumn are 7 A. M. and in summer 6 o'clock, A. M. One hour after the last cup of water

BREAKFAST.

A tender beefsteak or a mutton chop, with as little fat as possible, and without rich gravies; with it one cup of tea or coffee without sugar and milk.

DINNER.

Soup: Broth, carefully freed of all fat.

Roast and salad: Beefsteak, roast-beef, roast-veal, deer, hare, young pigeons and fowls, partridges, wild pigeons, snipes and wood-cocks; hind-legs of frogs, oysters.

Fish is prohibited, being too rich.

Of salads, allowed under certain circumstances are:

Lettuce, water and garden cresses, tomatoes—vinegar must be as sparingly added as possible.

DESSERT.

Stewed fruit, but without sugar. Dishes prepared of the white of eggs, the yolks being too rich.

Beverage: After dinner one glass of light Rhine or Moselle wine, or good Claret.

Strictly prohibited are: All rich dishes containing starch, rich soups, fish, vegetables prepared with fat, the yolk of eggs, milk, butter, rich cheese, pastry, chocolate and beer.

A nap after dinner must be avoided. In the afternoon, if possible, a long walk or a drive to the mountains or a game at Croquet, Lawn Tennis or Bowling. About 6 o'clock, back to the spring, if such is prescribed.

SUPPER.

Cold roast of the above mentioned animals, one cup of tea without milk and sugar, perhaps a little Claret.

All meals must be taken without bread.

II. *Order of the day and Bill of Fare for plethoric persons.*

BREAKFAST.

(One hour after drinking the water.)

A glass of milk, with rolls or rusks, or a plate of milk and mush, oat-meal or panada. Chocolate may, under certain circumstances, be allowed.

DINNER.

Soup: Panada or broth with vegetable additions, except potatoes.

Roast, vegetables, salad. Young meat, so-called white meat, such as roast veal, very young poultry roasted or in ragout. Fish to be selected from the first column of the synoptical table.

Jellies, with addition of the allowed meats and fishes.

All vegetables are allowed which are found in the first column of the synoptical table.

According to the peculiarity of the patient, the salads allowed to corpulent persons may be permitted.

Potatoes are to be taken only very moderately; it is best to avoid them altogether.

DESSERT.

Stewed fruit.

Beverages: Light wine in moderate quantity; Coffee and tea are prohibited.

No nap after dinner, but plenty of exercise in the open air, frequent draughts of water from the mountain brooks and springs.

SUPPER.

Clabber or sour milk,* broth, free of fat with the above mentioned additions, or cold roast with some light beer or wine.

*We allow milk for this class of patients, if it agrees with them at all, in spite of a physiological contradiction. According to experience milk is not as nutritious for grown persons as for children.

III. *Order of the day and Bill of Fare for patients suffering from Hœmorrhoids.*

As early as possible in the morning to the springs.

One hour after the last cup of water:

BREAKFAST.

Milk, light coffee or tea with milk, rolls, or better, rusks.

DINNER.

Soup: Broth without fat, with additions of young meat of white fibre, such as veal or young fowl, especially chickens or pigeons.

All meat of full grown animals, as well as vegetables, must be avoided as additions to the soup.

Meat, vegetables, salad: The various dishes of veal, young fowl and pigeons to be found in the first column of the synoptical table.

Fish to be selected from the first column; likewise jellies with the kinds, of meat allowed.

All vegetables are allowed, which grow in the ground, except potatoes. If salad be allowed it must be chosen from the first column.

DESSERT.

Stewed fruit and grapes.

Beverages: Fresh or mineral water like seltzer, frequently taken, is recommended. Very light wines or beer may be taken, but in moderate quantities.

Forbidden: All dishes made of flour, eggs, cheese, all spices, strong coffee or tea, chocolate, strong wines or liquors.

After dinner, long walks to the mountains, or, if possible, long rides on horse-back, with the recommendation to drink plenty of water from the springs and mountain-brooks. About 6 o'clock back to the mineral springs.

SUPPER.

Clabber, bouillon without fat, with the above mentioned additions, or cold roast of the allowed sorts with tea or light wine, or beer.

IV. *Order of the day and Bill of Fare for people who suffer from regular chronic gout.*

In general, all food must be avoided which favors the formation of acids in the stomach and bowels, and of uric-acid and urea. Therefore, all azotic food, from the animal and vegetable kingdoms, must be limited as much as possible. Specially avoided must be meat of full grown animals, all legumen, tea, coffee, chocolate, wine, beer and other liquors. All acid dishes such as salad and fruit are interdicted.

Early in the morning to the springs, one hour after the last cup of water:

BREAKFAST.

Milk, oat-meal, meat of young animals, rice, etc.

DINNER.

Meat and vegetables. As long as the patient suffers very much, all meat of warm-blooded animals ought to be entirely avoided. He may however regale himself on boiled fish, or the hind-legs of frogs. According to the progress made in his recovery, he may proceed to dishes of veal, pigeon or chicken. These he can take with jelly.

Of vegetables, all the roots enumerated in the first column, are allowed; also spinach, dandelion and lettuce.

DESSERT.

Grapes may be allowed.

Beverages: Copious draughts of acidulous mineral and fresh water.

Nap after dinner prohibited.

After dinner: Plenty of exercise in the open air.

About 6 o'clock, back to the springs.

8 o'clock. SUPPER.

Very light.

As it is of the highest importance to compile the bill of fare for plethoric, hœmorrhoidal and gouty patients in such a manner as to withhold from them certain substances contained in meat, which by their introduction into the organism produce others of the same detrimen-

tal nature, we recommend in addition, the following general rules:

1. Meat should to be taken but once a day if possible and then at noon.

2. Even then it must be consumed sparingly, so as not entirely to satisfy the cravings of hunger. According to an old rule every meal ought to be interrupted, when one most enjoys it.

3. As it is likewise of importance to the above class of patients, that the food consumed should be regularly digested and that they should have plenty of exercise in the open air, it is strictly forbidden to take luncheon at noon, and dinner at 6 o'clock, for in the first place more food is thus consumed than is advantageous and secondly, digestion can thereby only be imperfect, consequently formation of acids in the stomach and bowels is promoted and finally much valuable time is lost, which could be better employed in walks, etc.

The dietetic prescriptions laid down so far for visitors to the springs, are made for the purpose of withholding from the organism certain superfluous, in some instances even pernicious substances, or to prevent their new-formation. In the following pages we turn our attention to another class of visitors to the springs, into whose organism certain substances, necessary for their welfare, are to be introduced, while others already present, but in a

morbid state, are to be improved. To this class belong chiefly those suffering from poverty of the blood (chlorosis) and those suffering from scrofula and rhachitis.

In compiling a Bill of Fare for those suffering from anæmia and chlorosis, we have to distinguish two different forms of this disease, one in which, together with anæmia, a certain leanness of the sick person prevails, and another, where in spite of anæmia, often a very considerable degree of corpulency may be observed.

Starting from these points of view the following order of the day and Bills of Fare may be recommended.

V. *Order of the day and Bill of Fare for patients suffering from anæmia with prevailing leanness.*

Early in the morning to the springs. One hour after taking the last cup of water:

BREAKFSAT.

Milk, light coffee or tea with milk, chocolate, rolls or rusks. A small beefsteak, mutton chops, game and fowl.

DINNER.

Soup: Broth with the additions of the above mentioned kinds of meat (Soup a la Reine,) or substances containing starch such as barley, rice, grits, sago, tapioca, peas, lentils, potatoes. If broth should be wanting, milk-soup may be substituted.

Meat: All roasts of meat with red fibre, likewise the poultry mentioned in the first column of the table.

Unfit and consequently to be avoided is all meat of too young animals and meat with a white fibre, like veal, pork, etc.

Fish is not interdicted, but can be replaced by something more nutritious.

Vegetables: Owing to their trifling nutritious value they can, as a matter of course, be considered but of little consequence and are therefore to be looked upon more as digestives, and as improving the taste of meat.

The most suitable are those growing in the ground, and legumens, such as young peas, etc. Salad is prohibited.

Dishes made of eggs are allowed, if they are so prepared that the albumen is not coagulated.

A nap after dinner is allowed.

After dinner moderate exercise in the open air, no fatiguing marches, but short walks in the neighborhood.

Between 6 and 7 o'clock, back to the spring.

SUPPER. Beefsteak, fowl or roast of the above mentioned kinds with weak tea or beer.

Cheese is forbidden.

VI. *Order of the day and Bill of Fare for patients suffering from anæmia with inclination to obesity.*

Early in the morning to the springs, one hour after the last cup of water:

BREAKFAST.

Broth, meat with a red fibre such as beef and mutton. Neither beer, nor other liquors are allowed.

DINNER.

Soup: Broth carefully freed of fat with addition of meat as in the morning. Boiled fish.

Meat: All roasts of meat with a red fibre, but without fat and without rich gravies, poultry.

Vegetables: These ought to be avoided if possible, or at least be taken only in small quantities. Those growing above-ground are preferable, and of these especially spinach.

The vegetables containing starch, salads, cheese and eggs are not allowed.

After dinner plenty of exercise in the open air.

About 6 o'clock, back to the spring.

SUPPER.

Beefsteak or cold meat of the above sorts, with weak tea or coffee, without milk or sugar.

With all meals as little bread as possible.

VII. *Order of the day and Bill of Fare for patients suffering from scrofula.*

Early in the morning to the springs, one hour after the last cup of water:

BREAKFAST.

Milk or coffee with milk, tea made of the leaves of the walnut tree, and rusks, meat of red fibre.

The time after breakfast must be spent in the open air.

11 to 12 o'clock: Baths of mineral water, sometimes with additions of mother-lye.

12 o'clock, LUNCHEON.

Beefsteak, warm or cold roast, and poultry of the kinds recommended in table No. V.

The interval until dinner to be spent out doors again.

DINNER.

Soup: Broth with additions of meat.

Meat: Meat and roasted poultry of the kinds allowed in table No. V.

Vegetables: All vegetables found in the first column of synoptical table growing above ground, except those containing starch, and of the others, salsify, carrots and asparagus.

DESSERT.

Stewed fruit.

Exercise out doors.

About 6 o'clock, to the springs.

SUPPER.

Milk, eggs prepared in various ways, meat.

All soups containing starch, all dishes prepared of flour or potatoes and likewise spirituous liquors are prohibited.

VIII. *Order of the day and Bill of Fare for patients suffering from rhachitis.*

In the process of the disease which we call Rhachitis, the lactic acid found in abundance in the bowels and the blood of the patient, is a principal symptom. As it is formed chiefly of food which contains starch, this should be strictly avoided. For the same reason a so-called milk diet, curiously enough prescribed very frequently in the treatment of this disease, must be prohibited. Here too, meat is greatly preferable to all other kinds of food, and since the baths as well as the rest of the dietetic rules in this disease are identical with those in scrofula, we refer the patients to the bill of fare for scrofulous persons from which are to be excluded milk, coffee, and tea of the leaves of the walnut.

There is yet to be mentioned for patients of the three last classes (anœmia, scrofula and rhachitis.)

1. That four meals are of greater benefit to them than three only during the day. This rule will, amongst others, prevent them from committing the mistake usually made by persons who eat less often but generally too much at a time. It is not important how much one eats, but how much of it is digested. If little is eaten, everything is digested, if, on the contrary, much is eaten, but little is digested, and owing to the indigestion brought on, often nothing at all. The desired end is not only gained, but the evil is increased.

2. Care must be had that at every meal a sufficient quantity of meat is taken.

3. Patients ought to pass all their leasure time out doors when the weather permits, but not take any fatiguing walks or perform any bodily or mental labor.

Synoptical table of allowed and forbidden food.

A. Animal food.

To be recommended.	Allowed in special cases.	Forbidden.
	1. Beef.	
Beefsteak (English.)	Roast-beef cured in vinegar.	Brains (too rich.)
Boiled Beef, stated manner.	Liver.	The heart (too dry and too tough)
Roast-meat.	Milt, boiled into soup.	Beef-tongue fresh in acid gravies.
Beef-tongue in jelly or slightly smoked	Kidneys.	
	2. Veal.	
Breast of veal and tender loin.	Calf's-heart.	Calf's-brains (too rich.)
Leg of veal.	Calf's-liver.	Calf's-lungs.
Veal-cutlets.	Kidneys.	Calf's-head fried.
Stewed veal *en ragout*.	Calf's-head boiled.	
Tongue of veal.		
Sweet-bread.		
	3. Mutton.	
Chops broiled on the grid-iron.	Kidneys.	Sheep's-liver.
Roast-mutton.	Leg of Mutton soaked in vinegar (immitation of roe.)	Sheep's-lungs.
Leg of mutton soaked in beer or Claret		
	4. Pork.	
Raw ham or salt herring in small quantities to sharpen the appetite.		Everything of pork is prohibited.

Synoptical table of allowed and forbidden food.

A. Animal food, continued.

To be recommended.	Allowed in special cases.	Forbidden.
	5. Game.	
Roast-hare, young and not cured. Roasted deer, young and not cured. Ragout of deer.	Hare-ragout without vinegar. Liver of roe.	
	6. Wild Poultry.	
Roasted partridge, prairie hen, heath cock, wild pigeons, field-hare, snipes and wood-cocks.	Ragout and fricassee of these animals quails, ortolans and pheasants.	
	7. Tame Poultry.	
Roasted chicken, pigeon and turkey.	Ragout and fricassee of these animals	Goose and duck.
	8. Fish.	
Fresh-water perch, mackerel, pike, trout, haddock, Bass.	Perch, pike, eel, carp, fresh herring, anchovis, sardines, cod fish, shad.	Salmon, eel, salmon-trout.
	9. Amphibious.	
Hind-legs of frogs roasted or in jelly.		Turtle.
	10. Crustaceous Animals.	
		Crabs, lobster and shrimps.
	11 Mollusks.	
Oysters and mussels, raw.	The same stewed.	The same roasted.

Synoptical table of allowed and forbidden food.

A. Animal food, continued.

To be recommended.	Allowed in special cases.	Forbidden.
	12. Broths with additions of meat.	
Broth with chopped meat. " " sweet-bread. " " hind legs of frogs. Turtle soup. Soups with eggs, but the latter must be added when the soup is finished boiling to prevent the coagulation of the albumen.	Oyster soup.	Soup with meat of the deer. " " liver. Mock turtle soup. Fish soups. Soups of crabs
	13. Dishes made of eggs.	
Raw, beaten up with pepper and salt and stirred in a glass of water. Soft boiled eggs. Poached eggs.	Scrambled eggs, omelets made without flour. Eggs in gravy of roasts.	Fried eggs.
	14. Milk.	
Fresh boiled or unboiled milk. Clabber or sour milk. Curds. Buttermilk. Whey as medicine.	Butter. Cream.	Cheese, especially when very rich.

Synoptical table of allowed and forbidden food.

B. Vegetable food.

To be recommended.	Allowed in special cases.	Forbidden.
	15. Bread and pastry.	
Wheat-bread, rolls, rusks.	Sponge cake (made of sugar, flour and beaten up eggs.) English biscuits.	Pastry made of flour with addition of butter or other fat. All kinds of confectionery, cakes, tarts, pastry containing fat.
	16. Dishes made of other substances containing starch.	
Milk-rice, barley in milk, rice milk with chocolate.	Grits in milk.	Dough made with water such as vermicelli, macaroni, dumplings, etc.
	17. Additions to soups.	
Barley-grits, oat meal, manna-groats, peeled barley, grits of wheat, rice, arrow-root, sago, tapioca.	Beans, peas, lentils must be boiled in soft water and carefully mashed and strained.	
	18. Vegetables.	
Mashed potatoes (puree de pommes de terre.) Potatoes ala maitre d'hotel. Young carrots, salsifies, asparagus, sprouts, spinach and orach, dandelion, lettuce. Young peas, artichokes.	Boiled potatoes with or without peeling, to be taken with some butter. Turnips, celery, horse-radish. Sour-krout.	Radish. Cabbage, Brussels-sprouts, red cabbage, kale, curled savoy, cauliflower, sorrel, rhubarb, pumpkins, cucumbers.

Synopticat table of allowed and forbidden food.

B. Vegetable food, continued.

To be recommended.	Allowed in special cases.	Forbidden.
	19. Salads.	
Asparagus, sprouts. salsifsy, celery.	Lettuce, water-cresses.	Salads are prohibited for most patients taking the waters. in certain diseases however they are allowed.
	20. Fruit.	Prohibited in every form, except stewed.
	21. Mushrooms.	Prohibited in every form.
	22. Substances to flavor the food	
	Sugar, honey, salt in moderate quantities.	Fat, vinegar, lemon-juice.
	Spices.	
	Capers, rose-mary, majoram, thyme, sage, savoury, coriander, funnel, anise, carraway-seed, cinnamon and ginger.	Garlic, onions, chives, pepper, cayenne, cloves, vanilla, nut-meg
	23. Beverages.	
	Coffee, tea, chocolate.	

Synoptical table of allowed and forbidden food.

B. Vegetable food, continued.

To be recommended.	Allowed in special cases.	Forbidden.
	Spirituous Liquors.	
Pure light lager beer. Light wines from the Rhine, Moselle, Palatinate and Bordeaux.		All heavy wines such as: Burgundy, Muscat-Lunel, Frontignac, Rives altes, Malaga, Sherry, Port wine, Madeira, Tinto di Rota, Alicante, Lacrymae Christi, Vino d'Asti, Tokay, Ruster, Malmsey, Wines from Chios, Cyprus and Shiraz. Champagne, brandy and liquors.

ALLEGHANY SPRINGS (Virginia).

LOCATION: In Montgomery county, Virginia, on the south fork of the Roanoke River, three miles south of Shawsville on the Norfolk and Western Railroad.

THE WATERS: Cold saline.

HOW LONG KNOWN AND USED: Fifty years.

EMERGENCE: From a valley surrounded by spurs of the Alleghany mountains, with magnesium, lime stone formation, of the lower silurian period, interlaced with argillaceous slates.

TWO SOURCES: One saline, the other lythia.

QUANTITY OF WATER DISCHARGED: Four hundred gallons in twenty-four hours.

TEMPERATURE: 54° Fahr

PARTICULAR CHARACTER: Limpid, odorless and of faint acid reaction, slightly saline taste.

EMPLOYED: Principally in drinking at the spring; transported in bottles.

SITUATION: In the midst of the Alleghany mountains, several thousand feet above the level of the sea.

CLIMATE: Delightfully cool and agreeable.

SEASON: From 1st of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATERS: These waters are excitant in different degrees; they act principally on the mucous membranes and the skin, and also increase the action of the kidneys. They are rich in sulphates and are mildly or actively purgative, according to the quantity taken; and are especially valuable in all forms of dyspepsia, in obstinate costiveness, in scrofula and cutaneous exanthemita, jaundice and billiary calculi.

Analysis.

ONE GALLON, 70,000 GRAINS, CONTAINS

Sulphate of	Magnesia	50.884290	grains.
Do.	Lime	115.294022	"
Do.	Soda	1.717959	"
Do.	Potassa	3.699081	"
Carbonate of	Copper	0.000359	"
Do.	Lead	0.000569	"
Do.	Zinc	0 001713	"
Do.	Iron	0.157049	"
Do.	Manganese	0 060617	"
Do.	Lime	3 613209	"
Do.	Magnesia	0.362362	"
Do.	Strontia	0.060536	"
Do.	Baryta	0.022404	"
Do.	Lithia	0.001679	"

ANALYSIS—*Continued.*

Nitrate of Magnesia	3.219562 grains.
Do. Ammonia	0.559412 "
Phosphate of Alumina	0.025549 "
Silicate of Alumina	0.207399 "
Fluoride of Calcium	0.022858 "
Chloride of Sodium	0.274676 "
Silicic Acid	0.882782 "
Crenic Acid	0.001921 "
Apocrenic Acid	0.000192 "
Other Organic Matter	1.999121 "
Carbonate of Cobalt, Teroxide of Antimony	Traces.
	183.069321
Solid ingredients by direct evaporation gave	184.072000 "
Half combined carbonic acid	1.885526 "
Free carbonic acid	5.455726 "
Hydro sulphuric acid	0.001339 "
Total amount of ingredients	190.411912 "

AVON SPRINGS (New York).

LOCATION: These springs are situated in the western part of the State of New York, on the Genesee River, near the village of Avon, and 18 miles from Rochester. The accommodations are sufficiently extensive for a large number of visitors.

THE WATERS are cold, and contain an appreciable quantity of lime, soda, magnesia and a trace of iodine.

HOW LONG KNOWN AND USED: They have been known and used since 1795.

SOURCES: There are four springs, viz.: The *New Bath*, The *Middle*, The *New*, and the *Iodine* or *Sylvian Springs*.

QUANTITY OF WATER DISCHARGED PER HOUR: The *New Spring* discharges about 54 gallons of water per minute.

THE TEMPERATURE OF THE WATER ranges from 45° to 51° Fahr.

PARTICULAR CHARACTER: Limpid, alkaline and gaseous.

EMPLOYED: In drinking and bathing.

CLIMATE: Temperate, but subject to considerable variations.

SEASON: From the 1st of June to the 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION: The waters are alterative; they act sensibly upon the liver, sometimes producing salivation, and when taken in considerable quantities are aperient. They have been successfully used in scrofula, skin diseases and chronic rheumatism.

Analysis.

NEW BATH SPRING.

Carbonate of lime	3.37	grains.
Sulphate of lime	0.44	"
Sulphate of magnesia	1 01	"
Sulphate of soda	4.84	"
Chloride of sodium	0.71	"
	10.37	

Sulphuretted hydrogen 3 91 cubic inches.
Temperature of the water 50° Fahr; specific gravity 1.00356.

NEW SPRING.

Carbonate of lime	3 58	grains.
Chloride of calcium	1.05	"
Sulphate of lime	7 17	"
Sulphate of magnesia	6.21	"
Sulphate of soda	1.71	"
	19.72	

Of gaseous contents—

Sulphate hydrogen	1 32	"
Carbonic acid	0.50	"
Nitrogen	0.67	"

And a minute fraction of atmospheric air.

MIDDLE SPRING.

Carbonate of lime	1.00	grains.
Sulphate of lime	10.50	"
Sulphate of magnesia	1.25	"
Sulphate of soda	2.00	"
Chloride of sodium	2.30	"
	17.05	
Sulphuretted hydrogen	12.00	"
Carbonic acid	5.60	"

IODINE OR SYLVIAN SPRING.

Chloride of magnesium	62.400	grains.
Chloride of sodium	97.440	"
Sulphate of lime	80 426	"
Carbonate of magnesia	15 974	"
Carbonate of lime	26 800	"
Vegetable matter	.240	"
Iodide of sodium.	296.240	
Sulphuretted hydrogen	20 684	cubic in.
Carbonic acid	4.992	"
	25.676	

BALLSTON SPRINGS (New York).

LOCATION: Seven miles southwest from Saratoga, near the village of Ballston.

THE WATERS: Cold, acidulous saline chalybeate, and sulphurous.

HOW LONG KNOWN AND USED: Discovered in 1769.

EMERGENCE: From a group of springs, and from a depth of six hundred and fifty feet, through a tube bored into the solid rock.

SOURCES: *Sans Souci*, *Park Low's Well*, the *United States*, *Franklin*, *Fulton Chalybeate*, and the *Washington Lithia Well*.

TEMPERATURE: 50° Fahr.

PARTICULAR CHARACTER: The water from the Artesian Spring is strongly impregnated with Lithia, limpid and pleasant to the taste.

EMPLOYED: Principally in drinking, and for bottling.

CLIMATE: Temperate.

SEASON: From 1st of June to the end of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Mild cathartic, active diuretic and tonic. Principally used in rheumatism, gout, diseases of the kidneys, liver and stomach; also an excellent remedy in dyspepsia and constipation.

Analysis.

SANS SOUCI SPRING.

Chloride of sodium	143.733 grains.
Bi-carbonate of soda	12.66 "
Bi-carbonate of magnesia	39 01 "
Carbonate of lime	43.407 "
Carbonate of iron	5 95 "
Hydriodate of soda	1.3 "
Silex	1. "
	247.15

UNITED STATES SPRING.

Chloride of sodium	53.12 grains.
Carbonate of soda	2.11 "
Carbonate of magnesia	0.72 "
Carbonate of lime with a little oxide of iron	3.65 "
Sulphate of soda	0.22 "
Silica	1.00 "
	60.82

Carbonic acid 30.50.

WASHINGTON LITHIA WELL.

Chloride of sodium	645.481
Chloride of potassium	9.232
Bromide of sodium	2.368
Iodide of sodium	.225
Fluoride of calcium	Trace.
Bi-carbonate of lithia	15 514
Bi-carbonate of soda	34.400
Bi-carbonate of magnesia	158.348
Bi-carbonate of lime	173.484
Bi-carbonate of strontia	.189
Bi-carbonate of baryta	4 739
Bi-carbonate of iron	2.296
Phosphate of soda	.003
Bi-borate of soda	Trace.
Alumina	.595
Silica	1.026
Organic matter	Trace.
Total per gallon, 231 cubic in	1,047.700
Carbonic acid gas	338,345 cub. in.
Density	1,010 "
Temperature	49° Fahr.

BATH ALUM SPRINGS (Virginia).

LOCATION: At the eastern base of the Warm Springs Mountain, in Bath county, Virginia, forty-five miles west from Staunton.

THE WATERS: The waters are cold, and strongly impregnated with alum, and iron.

HOW LONG KNOWN AND USED: They have only attracted public attention within the last half century.

EMERGENCE: From a slate-stone cliff twelve or fifteen feet high.

SOURCES: There are three principal springs. One is a strong chalybeate, with but little alum; another a milder chalybeate, with more alum, and another with a large quantity of alum and but little iron.

QUANTITY OF WATER DISCHARGED PER HOUR: The quantity of water varies as the season is wet or dry.

TEMPERATURE: 60° Fahr.

PARTICULAR CHARACTER: The gaseous matter in the waters is a mixture of carbonic acid, nitrogen and a small proportion of oxygen.

EMPLOYED: Only in drinking.

SITUATION: In a valley at the base of the Warm Springs Mountain.

CLIMATE: Cool, dry mountain climate, with considerable moisture.

SEASON: From the 1st of June to the middle of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Tonic and astringent. Valuable in *anemic* conditions generally, also in scrofula, eruptive and dyspeptic affections.

Analysis.

Pure water	58317.206
Free sulphuric acid	7.878
Carbonic acid	3.846
Sulphate of potash	.258
Magnesia	1.282
Lime	2.539
Protoxide of iron	21 776
Alumina	12.293
Crenate of ammonia	1 776
Silicate of soda	3.150
	54.798
Pure water	58317 202
	58372.000

BEDFORD SPRINGS (Pennsylvania).

LOCATION: In Bedford county, Pennsylvania, near the village of Bedford, one hundred miles west of Harrisburg, about one hundred miles east of Pittsburg, and one hundred and thirty miles northwest from Washington city.

THE WATERS: Cold water, sulphate of magnesia and lime, and carbonate of iron.

HOW LONG KNOWN AND USED: For nearly a century.

EMERGENCE: From limestone, calcarious and silicious formations.

FIVE SOURCES: Anderson's Spring, Sweet, Sulphur, Chalybeate, Limestone, and Upper Spring.

TEMPERATURE: From 52° to 58° Fahr.

PARTICULAR CHARACTER: Clear, lively and sparkling; no perceptible odor, saline taste.

EMPLOYED: Principally in drinking. A large quantity of the water is annually bottled and shipped.

SITUATION: High mountain elevation.

CLIMATE: Delightful summer climate; mornings and evenings cool, but warm in the middle of the day, during the summer.

SEASON: From the 1st of June to the middle of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATERS: Pur-

gative in doses of one or two glasses, laxative in smaller quantities and tonic. They also excite the action of the kidneys and skin, causing a free secretion of urine and perspiration. After several days' use it acts less energetically on the bowels, and one can drink several glasses with impunity. The use of this water is principally indicated in torpidity of the bowels, dyspepsia, engorgements of the liver and other viscera, chronic bowel affections and diseases of the lymphatic system.

Analysis of Anderson's Spring.

Sulphate of magnesia, or Epsom salts	20 grains.
Sulphate of lime	3¾ "
Muriate of soda	2½ "
Muriate of lime	¾ "
Carbonate of iron	1¼ "
Carbonate of lime	2 "
Loss	¾ "
Total No. of grains per gallon	31

Carbonic acid gas, 18½ cubic inches.

BERKELEY SPRINGS (West Virginia).

LOCATION: In the village of Berkeley, Morgan county, West Virginia, two and a half miles from Sir John's Run depot on the B. & O. Railroad ninety-three miles west from Washington city, and one hundred and eighty six miles northwest from Richmond, Va.

THE WATERS: Thermal, alkaline and gaseous.

HOW LONG KNOWN AND USED: The use and value of the baths were known to the Indians, but the Europeans first visited them in 1830, when they were called the "Warm Springs."

EMERGENCE: The waters issue from the base of a steep ridge of sandstone strata of various degrees of hardness.

SOURCES: There are five principal sources and numerous lesser ones, all within a hundred yards.

QUANTITY OF WATER DISCHARGED PER HOUR: About 2000 gallons per minute.

TEMPERATURE: A uniform and invariable temperature of 70° Fahr.

PARTICULAR CHARACTER: Limpid, sparkling and tasteless waters, which disengage numerous fine bubbles of gas.

EMPLOYED: In drinking, bathing, douche, showers, inhalations, &c. The swimming pools are very large and convenient, and are lined with white marble. The gentlemen's pool is 60x20 feet and five feet deep; the ladies' pool is somewhat smaller, and there are twenty private swimming pools 10x5 feet and four feet deep.

SITUATION: In a narrow valley, about eight hundred feet above the level of the sea.

CLIMATE: That of the mountain regions of Virginia generally; cool mornings and evenings, with a peculiar and bracing freshness. The atmosphere is dry, but of sufficient humidity to render it easily respirable and very salubrious

SEASON: From the 15th of May to the 1st of November. It is now in contemplation to erect a hydropathic establishment similar to those at Matlock in England and Divonne in France, after which the place will be open throughout the entire year.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Powerfully diuretic, sudorific and slightly laxative. It is beneficial in many diseases. It stimulates the functions of digestion, increases the appetite, and constitutes a very agreeable drink, and, as a "table water," will be found pleasant and valuable. The baths not only act as a cosmetic and beautifier of the skin and complexion, but are especially valuable in many of the diseases incident to women; and, from their tendency to counteract uric acid and phosphatic deposits, have been found to be almost a specific in rheumatism, whether simple or complicated with gout, sciatica, or other neurotic affections.

Analysis.

Carbonate of lime	5.00
Crenate	3.64
Iron	.08
Chloride of sodium	.90
Calcium	.21
Sulphate of magnesia	.36
Siliciate of lime	.63
Loss	.06
	10.88
Gaseous contents—	
Carbonic Acid	19.00
Oxygen	16.60
Nitrogen	64 30
	99.90

BETHESDA SPRINGS (Wisconsin).

LOCATION: At Waukesha, in the Prairie du Chien, twenty-one miles west from Milwaukee

THE WATERS: They belong to the class of bi-carbonated waters.

HOW LONG KNOWN AND USED: Discovered in 1868.

EMERGENCE: From the Prairie du Chien.

SOURCES: One principal spring.

QUANTITY OF WATER DISCHARGED PER HOUR: Sufficient for drinking and bathing.

TEMPERATURE: 60° Fahr.

PARTICULAR CHARACTER: Limpid and odorless.

EMPLOYED: In drinking and bathing.

SITUATION: Very attractive; beautiful landscape and lovely scenery.

CLIMATE: Healthy and delightful; very dry, cool and refreshing during the summer.

SEASON: From the 1st of June to the 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Alterative and decidedly diuretic. It has proved highly efficient in the treatment of diabetes and Bright's disease, inflammation of the urinary organs, torpid liver and dyspepsia.

Analysis.

In one U. S. or wine gallon, of 231 inches, there are:

Chloride of sodium	1.160 grains.
Sulphate of potassa	0.454 "
Sulphate of sodium	0.542 "
Bi-carbonate of lime	17.022 "
Bi-carbonate of magnesia	12.388 "
Bi-carbonate of iron	0 042 "
Bi-carbonate of soda	1 256 "
Phosphate of soda	a trace
Alumina	0.122 "
Silica	0.944 "
Organic matter	1.983 "
Total	35 710 grains.

BLADEN SPRINGS (Alabama).

LOCATION: In Clark county, about eighty miles from Mobile and six miles from Coffeeville.

THE WATERS: Cold, alkaline, carbonate of soda and sulphate of lime.

SIX SOURCES: Differing very slightly from each other.

QUANTITY OF WATER DISCHARGED PER HOUR: A very abundant supply.

PARTICULAR CHARACTER: Large amount of free carbonic acid.

EMPLOYED: Drinking and bathing.

SITUATION: Broken and hilly country, with native forest growth.

CLIMATE: Warm, but healthy.

SEASON: Spring, early summer and fall months.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATERS: They have been employed successfully in various affections of the stom-

ach, bowels and kidneys, as well as in chronic rheumatism and skin diseases

Analysis.

Sulphuretted hydrogen, quantity not ascertained.		
Carbonic acid gas	4.075	cubic inches.
Chloride of sodium	0.9625	"
Oxide of iron	0.0300	"
Sulphate of lime	0.0019	cubic inches.
Crenic acid	0 0912	"
Loss	0 0400	"
Carbonate of soda	4.1112	"
Carbonate of lime	0.3437	"
Carbonate of magnesia	0 1706	"
Silica of alumina	0 2631	"
Apocrenic acid	0.0750	"

BLUE LICK SPRINGS (Kentucky).

LOCATION: In Nicholas county, Kentucky, on the banks of Licking River, sixty-five miles above Cincinnati.

THE WATERS: Saline sulphur.

HOW LONG KNOWN AND USED: Since the early settlement of the State.

EMERGENCE: From a reservoir of stone.

SOURCES: Upper and lower Blue Lick Springs.

QUANTITY OF WATER DISCHARGED PER HOUR: Very abundant.

TEMPERATURE: 62° Fahr.

PARTICULAR CHARACTER: Clear, very strong odor and taste of sulphuretted hydrogen.

EMPLOYED: In drinking and bathing. It is very largely transported both in bottles and barrels

SITUATION: On the Licking River, about twenty feet from the water's edge.

CLIMATE: Well adapted for a summer resort.

SEASON: From 1st of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Alterative, stimulant, diuretic and laxative. Very valuable in affections of the liver, and in engorgement of the abdominal vicera generally; also efficacious in rheumatism and diseases of the skin.

Analysis.

One pint contains—solids:		
Carbonate of magnesia	0.017	grains.
Carbonate of lime	2.957	"
Chloride of potassium	0.174	"
Chloride of sodium	64.107	"
Chloride of magnesium	4.049	"
Sulphate of potassa	1.117	"
Sulphate of lime	4.249	"

ANALYSIS—*Continued.*

Iodide of magnesium	0.006	grains.
Bromide of magnesium	0.030	"
Alumina, phosphate of lime and oxide of iron	0.045	"
Silicic acid	0.138	"
Loss	2.216	"
Total	79.105	

BLUE RIDGE SPRINGS (Virginia).

LOCATION: At the summit of Blue Ridge Mountain, on the Norfolk and Western Railroad, forty-one miles west from Lynchburg, in the county of Botetourt, Virginia.

THE WATERS: Clear and odorless, belonging to the class of saline waters

HOW LONG KNOWN AND USED: Recently opened to the public.

EMERGENCE: From the Blue Ridge Mountains, beneath a ledge of lime stone.

SOURCES: One spring only, which yields about 150 gallons per hour.

TEMPERATURE: 52° Fahr.

EMPLOYED: Drinking only; it is bottled for transportation in half gallon bottles.

SITUATION: In the midst of wild and grand scenery, thirteen hundred feet above the level of the sea

CLIMATE: Delightful temperature during the summer; cool nights and mornings, dry, pure air.

SEASON; From 1st of June to 15th of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Mildly laxative or actively purgative, according to the quantity used and the susceptibility of the bowels; it also acts upon the skin and kidneys. Especially recommended in chronic dysentery and mucous diarrhœa, in the various forms of dyspepsia, in Bright's disease of the kidneys, chronic inflammation of the bladder, constipation, scrofula, &c.

Analysis.

Silicic acid	1.2629	grains.
Alumina	.1402	"
Bi-carbonate of iron	.4088	"
Bi-carbonate of magnesia	3 0100	"
Bi carbonate of lime	5.4383	"
Sulphate of magnesia	47.5565	"
Sulphate of lime	100.2174	"
Sulphate of soda	.9741	"
Sulphate of potash	.4056	"
Chloride of sodium	.2503	"
	159.6642	

BUFFALO LITHIA SPRINGS (Virginia).

LOCATION: In the midst of what is known as the "Buffalo Hills," in Mecklenberg county, Virginia, twelve miles from Scottsburg Depot on the Richmond and Danville Railroad.

THE WATERS are cold and contain a large quantity of magnesia, alumina, lime, potash and lithia

HOW LONG KNOWN AND USED: These waters have only been highly prized of late years.

EMERGENCE: From the surrounding hills, similar in general appearance to the Blue Ridge Mountains

THREE SOURCES: No. 1, No. 2 and No. 3, of which "No. 2" now attracts the largest share of public attention.

TEMPERATURE: 60° Fahr.

PARTICULAR CHARACTER: The water fresh from the spring is limpid and without taste or odor.

EMPLOYED: Only in drinking; it is bottled and transported in large quantities.

SITUATION: In a hilly country, five hundred feet above the level of the sea.

CLIMATE: Moderate and dry.

SEASON: From 1st of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: The first effect is to excite the capillary circulation, producing flushed face and quickened pulse; they act decidedly upon the skin and kidneys, producing active diuresis. These waters are highly recommended in rheumatism, gout and diseases of the kidneys.

Analysis.

Sulphate of magnesia	0 885 grains.
Alumina	9.067 "
Lime	33.067 "
Carbonate of potash	29.300 "
Bi-carbonate of lime	14.963 "
Lithia	2.250 "
Baryta	1.750 "
Iron	0.300 "
Chloride of sodium	4 921 "
Silica	1.873 "
Phosphoric acid	traces
Iodide	traces
Organic matter	small amount
Total number of grains per gallon	98.376
Sulphurretted hydrogen	8.3 cubic in.
Carbonic acid gas	59.2 "

CAPON SPRINGS (West Virginia).

LOCATION: In Hampshire county, West Virginia, twenty-five miles from Winchester, Va., and 15 miles from Capon Road Station on the Valley Branch of the B. & O. R. R.

THE WATERS: Carbonated alkaline.

HOW LONG KNOWN AND USED: For nearly fifty years.

EMERGENCE: From the base of a mountain cliff of slate formation.

TWO SOURCES.

QUANTITY OF WATER DISCHARGED PER HOUR: 6000 gallons.

TEMPERATURE: 66° Fahr.

PARTICULAR CHARACTER: Limpid, sparkling, gaseous, tasteless and odorless.

EMPLOYED: In drinking and bathing. The swimming bath is one of the largest and most delightful in the world.

SITUATION: In a valley west of North Mountain, nearly two thousand feet above the level of the sea.

CLIMATE: Delicious and salubrious during the summer. The atmosphere is dry and very exhilarating; temperature pleasant throughout the entire day; nights delightfully cool.

SEASON: From the 1st of June to the 1st of November.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER. Antacid, highly diuretic, laxative when taken in large quantities. Very efficacious in the treatment of rheumatism and gout, in acid forms of dyspepsia and gastric catarrh. It also stimulates the liver and causes an active secretion of bile. Especially valuable in malarial troubles, in uric acid, gravel and Bright's disease of the kidneys. It is highly esteemed in the treatment of the various forms of diseases incident to females.

Analysis.

The following result was obtained on complete analysis, making the usual assumptions as to the distribution of acid and basic constituents. In all probability, the silicate really exists as soluble silicic acid, or a silicate:

	GRAINS PER IMPERIAL GALLON.	
	No. 1. "Main Spring."	No. 2. "Beauty Spring."
Sodium carbonate	.591	.631
Lithium carbonate	Distinct trace.	Faint trace.
Calcium carbonate	8.325	8.355
Magnesium carbonate	1.441	1.269
Ferrous carbonate	.041	.052
Manganous carbonate	Trace.	Trace.
Cupric carbonate	.....	Trace.
Sodium chloride	.056	.054
Potassium sulphate	.170	.163
Strontium sulphate	Trace.	Trace.

ANALYSIS—*Continued.*

Calcium sulphate	.593	.408
Calcium phosphate	.002	.002
Calcium fluoride	Trace.	Trace.
Alumina	.018	.015
Silica	.707	.672
Nitrates	Trace.	Trace.
Organic matter	.204	.189
	12 138	11.810

DISSOLVED GASES.

	CUBIC INCHES PER IMPERIAL GALLON. (60° F. AND 30 IN PRESS.) No. 1.	No. 2.
Carbon dioxide	8 57	7.81
Oxygen	1.76	1.69
Nitrogen	3.68	3.71
	14 01	13.21

FREE GASES.

From No. 1 gas, escapes in bubbles at frequent intervals, to the extent of about 300 or 350 cubic inches per hour. This consists of

Nitrogen	78.74
Oxygen	9.02
Carbon dioxide	4.38
Marsh gas	7.87
	100.00

The specific gravity of water was found to be:

No. 1 ..... 1.000 091 } at 15°.5.C.
No. 2 ..... 1.000.088 }

The temperature of the water is 65°. 5 F., showing the Springs to be distinctly thermal.

The water from the two Springs may be considered as essentially the same.

I. W. MALLET,
Prof. of Analytical and Agricultural Chemistry,
University of Virginia.

JAN. 27, 1877.

FAUQUIER WHITE SULPHUR SPRINGS.

LOCATION: In Fauquier county, Virginia, seven miles from Warrenton and forty-seven miles west of Washington city.

THE WATERS: Cold sulphur.

HOW LONG KNOWN AND USED: More than half a century.

ONE SOURCE.

TEMPERATURE: 56° Fahr.
PARTICULAR CHARACTER: Limpid, strong odor and taste of sulphuretted hydrogen.
EMPLOYED: In drinking only.
SITUATION: In an undulating country.
CLIMATE: Very warm in the summer season; moderately pleasant nights.
SEASON: From 1st of June to the middle of October.
PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Laxative and diuretic when first used. Valuable in rheumatism, diseases of the skin, chronic affections of the liver and kidneys, dyspepsia, &c.

GETTYSBURG SPRINGS (Pennsylvania).

LOCATION: Near the town of Gettysburg, in Adams county, Pennsylvania.
THE WATERS: Alkaline, carburetted.
HOW LONG KNOWN AND USED: Since 1864.
SOURCES: From one spring.
EMPLOYED: In drinking only.
SITUATION: Among the hills surrounding Gettysburg.
CLIMATE: Pleasant, mountain climate.
SEASON: From the 1st of June to 1st of October.
PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: The waters are said to possess an alterative power. They have been employed in dyspepsia, chronic diarrhœa, and affections of the kidneys and bladder.

Analysis.

Sulphate of baryta	Trace.
Sulphate of strontia	0,004.27 grains.
Sulphate of lime	0,831.45 "
Sulphate of magnesia	6,779.40 "
Sulphate of potash	0,208.36 "
Sulphate of soda	2,467.76 "
Chloride of sodium	0,657.90 "
Chloride of lithium	Trace.
Bi-carbonate of soda	0,704.57 "
Bi-carbonate of lime	16,408.15 "
Bi-carbonate of magnesia	0,542.60 "
Bi-carbonate of iron	0,035 85 "
Bi-carbonate of manganese	0,006.69 "
Bi carbonate of nickel	Trace.
Bi-carbonate of cobalt	Trace.
Bi-carbonate of copper	0,000.50 "
Borate of magnesia	0,034.92 "
Phosphate of lime	0,006.79 "

ANALYSIS—*Continued.*

Fluoride of calcium	0,009 54	grains.
Alumina	0,003.80	"
Silicic acid	2,030.88	"
Organic matter, with traces of nitric acid, &c	0,708.70	"
Impurities suspended in the water, like clay, &c	1,100 69	"
	32,542.72	

HARRODSBURG SPRINGS (Kentucky).

LOCATION: At Harrodsburg, Mercer county, Kentucky; accessible by rail from Cincinnati, Louisville and Chattanooga.

THE WATERS: Cold.

HOW LONG KNOWN AND USED: Nearly a century.

FIVE SOURCES.

QUANTITY OF WATER DISCHARGED PER HOUR: Only enough for drinking purposes

EMPLOYED: In drinking only.

SITUATION: High, rolling land; about seven hundred feet above sea level.

CLIMATE: Pleasant summer climate.

SEASON: From the 1st of June to 1st of September.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Laxative and tonic. Useful in all forms of dyspepsia, chronic diarrhœa and dysentery.

Analysis.

By State Chemist. Qualitative—

Sulphate magnesia.....
Bi-carbonate magnesia.....
Bi-carbonate lime .....
Bi-carbonate iron .....
Chloride sodium..... .....Small.

HEALING SPRINGS (Virginia).

LOCATION: In Bath county, Virginia, accessible by stage, fifteen miles from Covington, on the Chesapeake and Ohio Railroad.

THE WATERS: Alkaline, carbonates and sulphates.

HOW LONG KNOWN AND USED: For more than half a century.

THREE SOURCES very near each other.

QUANTITY OF WATER DISCHARGED PER HOUR: A large volume.

TEMPERATURE: Uniformly 86° Fahr.

PARTICULAR CHARACTER: Beautifully bright and crystalline, gaseous.

EMPLOYED: In drinking and bathing.

HEALING SPRINGS (Virginia)—*continued.*

SITUATION: In a beautiful valley at the base of the Warm Springs Mountain.

CLIMATE: Delightful mountain climate.

SEASON: From 1st of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Diuretic, diaphoretic and laxative, alterative and tonic. They have been successfully employed in chronic ulcers, affections of the skin, scrofula, chronic ophthalmic affection, sub-acute rheumatism, neuralgia, and syphilitic affections.

Analysis.

Carbonate of lime	18.721 grains.
Carbonate of magnesia	1.964 "
Carbonate of iron	.275 "
Sulphate of lime	1.263 "
Sulphate of magnesia	7.392 "
Sulphate of potassa	2 530 "
Sulphate of iron	.100 "
Sulphate of ammonia	.234 "
Chloride of potassium	.253 "
Chloride of sodium	.288 "
Silicic acid	1.820 "
Organic acid, probably crenic	.876 "
Carbonic acid	2 286 "
Sulphuretted hydrogen	.00010 "
Bromine, Iodine } a trace of each.	
	38.00210 "

HOT SPRINGS OF ARKANSAS.

LOCATION: In Hot Springs county, Arkansas, fifty-five miles southwest from Arkansas, and twenty-two miles from Malvern. Connected by rail with all points in the United States.

THE WATERS: Thermal; impregnated with free carbonic acid.

HOW LONG KNOWN AND USED: Known to the aborigines, but not improved until 1807.

EMERGENCE: From a trifa formation.

SOURCES: There are seventy-one different sources.

QUANTITY OF WATER DISCHARGED PER HOUR: Aggregate discharge from all the sources about 20,000 gallons.

TEMPERATURE: From 93° to 157° Fahr.

PARTICULAR CHARACTER: Limpid, pure and tasteless.

EMPLOYED: Principally in bathing—douche, vapor and tub baths.

SITUATION: In a valley of the Hot Springs Mountain.

CLIMATE: In the summer warm days, cool and refreshing nights. The mercury rarely falls to zero in the winter. The climate is not subject to great extremes of either heat or cold.

SEASON: All the year.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: When taken internally it arouses the absorbent and secreting systems, and stimulates the haemic glands. Valuable in all rheumatic conditions of the system, in gout, scrofula, syphilis, mercurial poisoning and various skin diseases.

Analysis (by Prof. Larkin).

Silicic acid	24.74	grains.
Sesqui oxide of iron	1.12	"
Alumina	5.15	"
Lime	28 93	"
Magnesia	.73	"
Chlorine	.07	"
Carbonic acid	21.36	"
Organic matter	8.31	"
Water	1.72	"
Sulphuric acid	4 40	"
Potash	1.46	"
Soda	2.01	"
Iodide and bromide, a trace	....	"
Total	100 00	

HOT SPRINGS OF VIRGINIA.

LOCATION: In Bath county, Virginia, twenty miles by stage from Covington, on the Chesapeake and Ohio Railroad.

THE WATERS: Thermal, non gaseous.

HOW LONG KNOWN AND USED: For more than half a century.

EMERGENCE: From the Warm Spring Mountain.

SOURCES: From several sources near together.

QUANTITY OF WATER DISCHARGED PER HOUR: Not known.

TEMPERATURE: From 100° to 106°.

PARTICULAR CHARACTER: Limpid and tasteless.

EMPLOYED: Principally in bathing.

SITUATION: Elevated.

CLIMATE: Moderately pleasant.

SEASON: From the 1st of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATERS: Like hot baths, the waters of these springs stimulate the system, which is probably their chief sanative influence. They are much esteemed in various chronic affections, as rheumatism, bronchitis, skin diseases, &c.

Analysis.

Carbonate of lime	7.013
Carbonate of magnesia	1.324
Sulphate of lime	1.302
Sulphate of magnesia	1.530
Sulphate of soda	1.363
Chloride of sodium and magnesia, with a trace of chloride of calcium	0.105
Proto-carbonate of iron	0.096
Silica	0.045
	12.778

JORDAN WHITE SULPHUR SPRINGS (Virginia).

LOCATION: In Frederick county, Virginia, one hundred and eight miles west from Baltimore; two hundred and fifty miles northwest from Richmond; twenty-eight miles south of Harper's Ferry; two miles from Stephenson's Depot, Valley Railroad.

THE WATERS: Cold, sulphur

HOW LONG KNOWN AND USED: More than one hundred years.

EMERGENCE: From a slate and gravel formation.

SOURCES: One sulphur spring and one chalybeate spring.

QUANTITY OF WATER DISCHARGED PER HOUR: Sufficient for drinking purposes.

TEMPERATURE: 57° Fahr.

EMPLOYED: In drinking and bathing.

SITUATION: Elevated seven hundred and fifty feet above sea level.

CLIMATE: Very dry atmosphere; mean temperature about 68° Fahr.

SEASON: From 1st of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Aperient, diuretic, sudorific, alterative and tonic. Particularly recommended in chronic diseases of the liver, kidneys, stomach and glandular system, and skin affections.

Analysis.

Sulphate of lime	5.131	grains	per gallon.
Sulphate of potassa	2.090	"	"
Chloride of sodium	.763	"	"
Carbonate of potass	9.707	"	"
Carbonate of magnesia	2.881	"	"
Carbonate of iron	Trace.		
Carbonate of manganese	.014	"	"
Hydro sulphuric acid	.780	"	"
Silicic acid	.254	"	"
Alumina	.009	"	"
Total mineral matter	21.635		

LEBANON SPRINGS (New York).

LOCATION: In Columbia county, New York. Reached by Harlem Road from New York city, which is one hundred and fifty miles south of the Springs.

THE WATERS: Thermal carbonate.

HOW LONG KNOWN AND USED: From the early settlement of the country.

EMERGENCE: From gently rising hills.

ONE SOURCE.

QUANTITY OF WATER DISCHARGED PER HOUR: Thirty thousand gallons.

TEMPERATURE: 72° Fahr.

PARTICULAR CHARACTER: Clear, warm, tasteless.

EMPLOYED: Principally for bathing.

SITUATION: In a valley one thousand feet above the sea level, in the midst of beautiful scenery

CLIMATE: Very healthy.

SEASON: From the 1st of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: When used as baths they excite particularly the circulation and the functions of the skin. They also act upon the urinary organs and digestive apparatus.

Analysis.

The principal mineral constituents are the carbonates of soda, lime and sodium, the sulphates of potassa and magnesia, the oxide of iron and alumina.

MONTVALE SPRINGS (Tennessee).

LOCATION: In Blount county, Tennessee, twenty-four miles south of Knoxville.

THE WATERS: Cold, saline.

HOW LONG KNOWN AND USED: For more than half a century.

EMERGENCE: From the Apalachian range of mountains, which extends southwesterly through Tennessee.

EMPLOYED: In drinking and bathing.

SITUATION: High elevation.

CLIMATE: Pleasant mountain climate.

SEASON: From the 1st of June to the 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Slightly laxative in small quantities; purgative in larger doses. Valuable in dyspepsia and chronic diarrhœa.

Analysis.

Chloride of sodium	1 96
Sulphate of magnesia	12 00
Sulphate of lime	74 21
Sulphate of soda	4.51
Carbonate of lime	13 26
Carbonate of iron	2.40

OLD SWEET SPRINGS (West Virginia).

LOCATION: In Monroe county, West Virginia, two hundred and fifty miles west from Washington city, and ten miles from Alleghany Station on the Chesapeake and Ohio Railroad.

THE WATERS: Thermal, alkaline, gaseous.

HOW LONG KNOWN AND USED: For more than a hundred years.

EMERGENCE: From the base of Sweet Spring Mountain.

SOURCES: One principal source.

QUANTITY OF WATER DISCHARGED PER HOUR: About seventy thousand gallons

TEMPERATURE: 74° Fahr.

PARTICULAR CHARACTER: Warm, limpid, sparkling, inodorous, of a sweetish taste, and discharges numerous bubbles of gas.

EMPLOYED: Principally in bathing.

SITUATION: In a beautiful valley, between the Sweet Spring and Alleghany Mountains.

CLIMATE: Delightful summer climate—cool mornings and evenings—dry atmosphere.

SEASON: From the 15th of June to the 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: The water is excitant, tonic and diuretic—sometimes slightly laxative, but with some persons constipating. The water acts in a special manner on the mucous memoranes, notably of the stomach and genito-urinary organs. Especially valuable in dyspepsia and gastralgia, in hepatic colic not depending on calculus, and in hepatic engorgements.

Analysis.

Sulphate of lime	5.703
Sulphate of magnesia	4.067
Sulphate of soda	2.746
Carbonate of lime	13.013
Chloride of sodium	0.060
Chloride of magnesium	0.136
Chloride of calcium	0.065
Peroxide of iron (sesquioxide)	0.061
Silica	0.075
Earthy phosphate	A trace.
Carbonic acid	37.17
Nitrogen	1 86
Oxygen	A trace.

Sulphuretted hydrogen, a trace, too small to be measured.

ORKNEY SPRINGS (Virginia).

LOCATION: In Shenandoah county, Virginia, twelve miles from Mt. Jackson, on the Valley Branch of the Baltimore and Ohio Railroad.

THE WATERS: Cold, alkaline, calcic, alkaline sulphur, ferruginous.

HOW LONG KNOWN AND USED: For more than fifty years.

EMERGENCE: From a valley in North Mountain.

SOURCES: There are five or six springs, the principal being the "Bear-Wallow," the "Healing" and the "Powder" or Sulphur.

TEMPERATURE: About 65° Fahr.

PARTICULAR CHARACTER: The different sources present different characteristics.

EMPLOYED: In drinking.

SITUATION: Elevated valley on the eastern slope of North Mountain.

CLIMATE: Very pure, healthy and dry atmosphere.

SEASON: From the 1st of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: The principal spring is slightly aperient, diuretic, tonic. Valuable in dyspepsia, rheumatism, gout, and many of the diseases of females.

RAWLEY SPRINGS (Virginia).

LOCATION: In Rockingham county, Virginia, eleven miles west from Harrisonburg, on the Valley Railroad.

THE WATERS: Cold, chalybeate.

HOW LONG KNOWN AND USED: But little known as a watering place until 1870, but known to citizens for seventy-five years.

EMERGENCE: From the North Mountain, in the Valley of Virginia, through a bed of disintegrating coal and a vein of brown hemetite ore.

THREE SOURCES: Chalybeate, sulphur and magnesia.

QUANTITY OF WATER DISCHARGED: About 158 imperial gallons per minute from the main fountain.

TEMPERATURE: From 51° to 54° Fahr.

PARTICULAR CHARACTER: Clear and transparent as it flows from the earth, but on exposure to the air soon deposits a rust-colored precipitate, mainly of oxide of iron.

EMPLOYED: In drinking and bathing.

SITUATION: Very elevated.

CLIMATE: Mountain climate, exceptionally healthy and delightful in the summer season.

SEASON: From 15th of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATERS: Tonic, non-irritant, resolvent. Their principal indications are in chlorosis, anemia, neuralgia, dyspepsia, some of the maladies peculiar to females, and in all diseases caused by poverty of the blood or debility of the nervous system.

Analysis.

Protoxide of iron	1.3214	grains per	imperial gallon.
Protoxide of manganese	.0122	"	"
Alumina	.0514	"	"
Magnesia	.3874	"	"
Lime	.3536	"	"
Lithia, (detected by spectroscope)	Trace		
Soda	.3068	"	"
Potash	.0721	"	"
Ammonia	Trace		
Sulphuric acid	.5208	"	"
Chlorine	.0315	"	"
Silicic acid	.8163	"	"
Carbonic acid (combined)	1.5624	"	"
Organic matter (in humoid acid).	.3531	"	"

The gases dissolved are as follows:

Carbonic acid	7.24	cubic inches	per	imperial gallon.
Oxygen	2.07	"	"	"
Nitrogen	4.18	"	"	"

RED SULPHUR SPRINGS (Virginia).

LOCATION: In Monroe county, Virginia, about twenty-five miles south of Lewisburg, in Greenbrier county, West Virginia. They are reached by the Chesapeake and Ohio Railroad.

THE WATERS: Cold, saline sulphur.

HOW LONG KNOWN AND USED: For more than half a century.

EMERGENCE: From the Apalachian chain of mountains.

SOURCES: From one principal spring.

QUANTITY OF WATER DISCHARGED PER HOUR: Sufficient for drinking purposes.

PARTICULAR CHARACTER: Clear and transparent when in its natural state, and out of contact with atmospheric air. Air, acids and other agents separate the sulphur from the water. The water deposits a red colored matter, which is said to be moss or lichen. The water has a distinct taste and smell of sulphuretted hydrogen.

EMPLOYED: Exclusively in drinking.

SITUATION: High mountain elevation.

CLIMATE: Delightfully cool in the summer season.

SEASON: From the 1st of June to the 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Stimulating, tonic, alterative and diuretic. This water has long been highly valued as a curative agent in consumption and other chronic affections of the pulmonary organs; it has also been used with success in the treatment of subacute inflammations of the stomach, liver, spleen, kidneys, bladder and intestines, and in some forms of uterine disease.

Analysis.

Carbonic acid	1245	grains.
Nitrogen	1497	"
Oxygen	260	"
Hydro-sulphuric acid	86	"
	3088	"

And afford of—

Siliceous and earthy matter	0.70
Sulphate of soda	3.55
Sulphate of lime	.47
Carbonate of lime	4 50
Carbonate of magnesia	4.13
Sulphur compound	7.20
Carbonic acid	2.71
	23.26

RICHFIELD SPRINGS (New York.)

LOCATION: In Oswego county, New York, ninety-five miles west from Albany and two hundred and fifteen miles northwest from New York city.

THE WATERS: Sulphates and bicarbonates

HOW LONG KNOWN AND USED: Before the advent of the white man.

ONE SOURCE.

QUANTITY OF WATER DISCHARGED PER HOUR: Sufficient for drinking purposes.

EMPLOYED: In drinking.

SITUATION: Delightfully situated in a plain near Schuyler's Lake.

CLIMATE: Pleasant summer climate.

SEASON: From 1st of June to 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Alterative and diuretic, valuable in rheumatism, affections of the liver and many forms of dyspepsia.

Analysis.

Bicarbonate of magnesia	20	grains.
Bicarbonate of lime	10	"
Chloride of sodium and magnesia	1.5	"
Sulphate of magnesia	30	"
Hydrosulphate of magnesia and lime	2	"
Sulphate of lime	20	"
Sulphuretted hydrogen gas per gallon	26.6	inches.

ROANOKE RED SULPHUR SPRINGS (Virginia).

LOCATION: In Roanoke county, Virginia, near Salem, sixty miles west from Lynchburg, Va., on the Norfolk and Western Railroad.

THE WATERS: Cold, sulphur.

HOW LONG KNOWN AND USED: Over fifty years.

EMERGENCE: Sandstone and iron deposits.

THREE SOURCES.

QUANTITY OF WATER DISCHARGED PER HOUR: Ample for two hundred guests.

TEMPERATURE: 52° Fahr.

PARTICULAR CHARACTER: Clear when first discharged, but after standing a white deposit of sulphur drops down.

EMPLOYED: In drinking only.

SITUATION: On mountain side, twenty-two hundred feet above the level of the sea.

CLIMATE: Very dry and cool.

SEASON: From 15th of May to 15th of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATERS: They increase the volume of the pulse, but diminish its frequency; alterative and diuretic. They are considered valuable in pulmonary affections and vascular excitements, and are said to be efficacious in certain forms of renal, viceral and womb diseases.

Analysis.

Grains of anhydrous constituents in one gallon of 231 cubic inches.

Calcium carbonate	6.53650
Magnesium carbonate	5.83876
Lithium carbonate	0.01549
Manganese carbonate	0.01624
Iron carbonate	0.05842
Copper carbonate	Trace.
Sodium chloride	0.24401
Ammonium chloride	0.01801
Calcium phosphate	0.02931
Lead sulphate	Trace.
Barium sulphate	Trace.
Strontium sulphate	1.71000
Calcium sulphate	2.19142
Sodium sulphate	3.03719
Potassium sulphate	0.32626
Sodium hyposulphite	0.03046
Ammonium nitrate	0.05476
Alumina	0.00648
Silica	0.83951

ANALYSIS—*Continued.*

Organic matter	0.76005
Arsenic	Trace.
	21.70287
Carbonic anhydride combined with monocarbonates to form bicarbonates	5.96680
	27.66967

Cubic inches gases per gallon:

Carbonate andidride	12 40
Sulphuretted hydrogen	2.00

ROCKBRIDGE ALUM SPRINGS (Virginia).

LOCATION: In Rockbridge county, Virginia, one hundred and seventy-five miles northwest from Richmond; one hundred and eighty miles west from Washington, and about three hundred miles east from Cincinnati.

THE WATERS: Cold, astringent, ferruginous.

HOW LONG KNOWN AND USED: As a health resort for more than fifty years.

EMERGENCE: From a mass of shale-rock.

SOURCES: Five different reservoirs are formed by the percolation of water through the mass of shale,

QUANTITY OF WATER DISCHARGED PER HOUR: Variable.

TEMPERATURE: 60° Fahr.

PARTICULAR CHARACTER: Clear, odorless, with a strongly styptic taste.

EMPLOYED: In drinking only. They are largely transported both in wood and glass vessels.

SITUATION: In a valley formed by the North and Mill Mountains.

CLIMATE: Temperate and agreeable mountain climate; cool evenings and nights.

SEASON: From the 1st of June to the 1st of October; but it is in contemplation to establish a sanitarium here, which will be kept open all the year.

PHYSIOLOGICAL AND THERAPEUTIC ACTION: These waters occasionally act as a purgative when taken in large quantities. They have proved a reliable remedy in scrofula, skin diseases, chronic diarrhœa, dyspepsia, and in many female diseases.

Analysis (Well No. 2).

Sulphate of potash	1.765
Sulphate of lime	3.263
Sulphate of magnesia	1.763
Protoxide of iron	4.863

ANALYSIS—*Continued.*

Alumina	17.905
Crenate of ammonia	0.700
Chloride of sodium	1.008
Silicic acid	2.840
Free sulphuric acid	15.224
Carbonic acid	7.356
	56 687
Pure water	58315.313
	58372.000

SARATOGA SPRINGS (New York).

LOCATION: In the city of Saratoga, New York.

THE WATERS: Acidulo-saline or carbonated saline.

HOW LONG KNOWN AND USED: As early as 1767.

EMERGENCE: Calcarious tufa.

SOURCES: The waters emerge from eighteen or twenty sources.

QUANTITY OF WATER DISCHARGED PER HOUR: A very great volume.

TEMPERATURE: From 47° to 51° Fahr.

PARTICULAR CHARACTER: Cold, clear, sparkling, of saline taste and very gaseous.

EMPLOYED: In drinking and bathing, and exportation in bottles and barrels.

SITUATION: Moderately elevated.

CLIMATE: Healthy, cool, dry atmosphere. The middle of the day in the summer season is generally warm, but the nights are rendered tolerably cool by recurring breezes.

SEASON: From the 1st of June to the 1st of November.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATERS: Sanative in small quantities, purgative in larger doses. They have been used in the cure of almost every species of disease, both chronic and acute, and hold the highest rank in the list of the mineral waters of America. Their analysis shows them to be much richer in mineral properties than similar springs in Europe, The selection of the spring to be used must be governed by the malady to be treated.

Analysis.

CONGRESS SPRING.

Chloride of sodium	385.0
Hydriodate of soda	3.5
Carbonate of soda	
Bicarbonate of soda	8.982
Carbonate of magnesia	
Bicarbonate of magnesia	95.788

ANALYSIS—*Continued.*

Carbonate of lime	98.098
Carbonate of iron	5.075
Silica	1.5
Hydrobromate of potassa	a trace.
	597.943

Gaseous contents:

Carbonic acid	311 cubic inches.
Atmospheric air	7 "
	318

EMPIRE SPRING.

Chloride of sodium	269.696
Bicarbonate of lime	141.824
Bicarbonate of magnesia	41.984
Bicarbonate of soda	30.848
Hydriodate of soda or iodine	12.000
Bicarbonate of iron	a trace.
	496.352

Specific gravity 1039.

EXCELSIOR SPRING.

Chloride of sodium	370.642 grains.
Carbonate of lime	77.000 "
Carbonate of magnesia	32.333 "
Carbonate of soda	15.000 "
Silicate of potassa	7.000 "
Carbonate of iron	3.215 "
Sulphate of soda	1.321 "
Silicate of soda	4.000 "
Iodide of soda	4.235 "
Bromide of potassa	trace.
Sulphate of strontia	trace.
Solid contents in a gallon	514.746 grains.
Carbonate acid	250 cubic inches.
Atmosphere	3 "
Gaseous contents	243 "

SARATOGA SPRING.

Chloride of sodium	565.300
Chloride of potassium	.347
Chlorides of calcium and magnesia	traces.
Bicarbonate of soda	6.752
Bicarbonate of lime	56.852

ANALYSIS—*Continued.*

Bicarbonate of magnesia	20.480
Bicarbonate of iron	1.724
Sulphate of lime	.448
Sulphate of magnesia	.288
Sulphate of soda	2.500
Sulphate of potassa	.370
Silicic acid	1 460
Alumina	.380
Per gallon	656 911
Free carbonic acid gas	212 cubic inches.
Atmospheric air	4 "
Per gallon	216 "

SHARON SPRINGS (New York).

LOCATION: In the village of Sharon, Schoharie county, New York; accessible from the New York Central Railroad.

THE WATERS: Cold, sulphur and magnesia.

HOW LONG KNOWN AND USED: For many years; they have assumed extraordinary prominence. They were known and used by the Indians.

EMERGENCE: From a valley, about eleven hundred feet above the level of the sea.

TWO SOURCES: White Sulphur Spring and Gardner Magnesia Spring.

QUANTITY OF WATER DISCHARGED: The Sulphur Spring discharges about four barrels of water per minute.

TEMPERATURE: Invariably 48° Fahr

PARTICULAR CHARACTER: Clear and sparkling; free from roughness or acidity to the taste, which is characteristic of most sulphur waters.

EMPLOYED: In drinking and bathing. The best sulphur bath-houses in America. The ladies' house contains forty and the gentlemen's fifty-two bath-rooms, and the bath-tubs are all of slate.

SITUATION: In a hilly region, with pleasant scenery.

CLIMATE: Pure and bracing air, free from malarial impurities; cool and pleasant nights, even in the warmest summer weather.

SEASON: From the 1st of June to the 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: A prompt and powerful alterative, aperient, diuretic, diaphoretic and deobstruent. Especially valuable in rheumatism, gout, paralysis, stiff joints, congestion of the liver and kidneys, abdominal plethora, hemorrhoids, neuralgia, dyspepsia, leucorrhœa and dysmenorrhœa arising from certain conditions; also efficient in the treatment of diseases of the skin.

Analysis.

WHITE SULPHUR SPRING.

Contents of one gallon—		
Bi-carbonate of magnesia	24.	grains.
Sulphate of magnesia	34.	"
Sulphate of lime	85 4	"
Hydro-sulphate of magnesia and lime	3.	"
Chloride of sodium and magnesium	2.7	"
Solid contents	149.1	
Hydro-sulphuric acid gas, or sulphuretted hydrogen	20 5	cubic in.

Temperature invariably 48° Fahr.

GARDNER MAGNESIA SPRING.

Contents of one gallon—		
Sulphate of magnesia	19.680	grains.
Sulphate of lime	93.500	"
Bi-carbonate of magnesia	1.360	"
Bi-carbonate of lime	9.698	"
Bi-carbonate of soda	.554	"
Chloride of sodium	1.232	"
Chloride of magnesium	.438	"
Chloride of calcium	.162	"
Sulphurets calcium and magnesia	.625	"
Silicic acid	.400	"
Solid contents	127.639	
Sulphuretted hydrogen	6.00	cubic in.
Carbonic acid	2.22	"
Atmospheric air	3.00	"

Temperature invariably 48° Fahr.

SILURIAN SPRINGS (Wisconsin.)

LOCATION: Near Waukesha, Wisconsin.

THE WATERS: Alkaline carbonate

HOW LONG KNOWN AND USED: Only recently opened to the public.

EMERGENCE: From an elevation of fifty feet above Fox River.

ONE SOURCE.

PARTICULAR CHARACTER: Clear, odorless, free from organic matter.

EMPLOYED: In drinking and bathing.

SITUATION: Elevated.

CLIMATE: Healthy.

SEASON: From 1st of June to 1st of October.

PYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Alterative, diuretic and slightly laxative Valuable in chronic malarial troubles, in certain dyspeptic disorders, in diseases of the kidneys, in rheumatism and gout, and in chronic dysentery.

Analysis.

Chloride of sodium	0.1926 grains.
Sulphate of sodium	0.2917 "
Bicarbonate of sodium	0.0301 "
Carbonate of calcium	9.9277 "
Carbonate of magnesium	6.8324 "
Carbonate of iron,	0.1285 "
Phosphate of iron	traces.
Phosphate of manganese	traces.
Alumina	0.5827 "
Silica	0.7004 "
Organic matter	very faint trace.
Total solids	18.6861 grains.
Carbonic acid gas	44.7 cubic in. per gallon.

SWEET CHALYBEATE SPRING (Virginia).

LOCATION: In Alleghany county, Virginia, one hundred and forty-nine miles from Washington and nine miles from Alleghany Station, on the C. & O. R. R.

THE WATERS: Thermal, ferruginous, carbonates.

HOW LONG KNOWN AND USED: More than three-quarters of a century.

EMERGENCE: From masses of porous stone.

THREE SOURCES:

QUANTITY OF WATER DISCHARGED PER HOUR: About five thousand gallons.

TEMPERATURE: 76° Fahr.

PARTICULAR CHARACTER: Clear, warm, and of a sweet ferruginous taste.

EMPLOYED: In drinking and bathing.

SITUATION: within one mile of the Old Sweet Springs, and in the same valley.

CLIMATE: Very bracing and healthy.

SEASON: From the 1st of June to the 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Powerful tonic, slightly laxative and diuretic. Highly recommended in nervous dyspepsia, anæmia, chlorosis, lucchorœa, spermatorrhœa, and especially valuable in many forms of neuralgia.

Analysis.

One quart of water contains—

Carbonate of lime	4 grains.
Carbonate of magnesia	3 "
Carbonate of iron	2 "
Silex	1 grain.
Sulphate of magnesia	1 "
Muriate of soda	½ "
Iron combined	1 "

Carbonic acid.

TATE SPRING (Tennessee).

LOCATION: In Grainger county, Tennessee, ten miles north of Morristown Station, on the East Tennessee, Virginia and Georgia Railroad.

THE WATERS; Cold, saline and ferruginous.

HOW LONG KNOWN AND USED: For more than a quarter of a century.

EMERGENCE: From the southern base of Clinch Mountain.

SOURCE: One spring.

QUANTITY OF WATER DISCHARGED PER HOUR; One hundred and twenty gallons.

TEMPERATURE: 55° Fahr.

PARTICULAR CHARACTER: Transparent, tasteless, inodorous, gaseous.

EMPLOYED: In drinking and bathing.

SITUATION: Fourteen hundred feet above sea level.

CLIMATE: Pure and healthful atmosphere.

SEASON: All the year.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Alterative and tonic; the water has been found efficacious in dyspepsia, in functional disorders of the nervous system, in diseases of the liver, bowels and kidneys, and in some of the diseases of females.

Analysis.

Sulphuric acid	131.27
Lime	81.12
Magnesia	10.99
Iron peroxide	1.00
Magnesia peroxide (traces).	
Potash and Soda	5.90
Chlorine	32.63
Silicia, soluble	.27
Phosphoric acid	.71
Carbonic acid	9.90
Nitric acid	.02
Total	272.91

ANALYSIS—*Continued.*

Sulphate of lime	160.66
" of magnesia	31.97
" of soda	8.50
" of potassia	1.54
Chloride of sodium	40.27
" iron	2 92
" magnesia	.69
Iodide of sodium (traces).	
Phosphate of lime	1.14
Carbonate of lime	21.56
Silicia	2.70
Nitric acid	.02
Total	272.91

WARM SPRINGS (North Carolina).

LOCATION: In Madison county, North Carolina, one hundred and fifty miles north from Chattanooga and four hundred and seventy-five miles southwest from Washington city.

THE WATERS: Thermal, calcic sulphur waters.

HOW LONG KNOWN AND USED: More than sixty years.

SOURCES: About twenty springs.

QUANTITY OF WATER DISCHARGED PER HOUR: From the principal spring about nine thousand gallons.

TEMPERATURE: From 104° to 117° Fahr.

PARTICULAR CHARACTER: Limpid, odorless and tasteless.

EMPLOYED: In drinking and bathing.

SITUATION: In a valley surrounded by mountains, two thousand feet above the level of the sea.

CLIMATE: Cool and pleasant in the summer.

SEASON: Open all the year.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATERS: These thermal baths and waters have been successfully used in gout, rheumatism, neuralgia, diseases of the skin, paralysis, and many of the diseases incident to females. Analysis shows the principal mineral constituent to be chloride of potassium, sodium, magnesium and calcium, and sulphate of potassa, soda, magnesia and lime.

WARM SPRINGS (Virginia).

LOCATION: In Bath county, Virginia, fifteen miles from Milboro' Station, on the C. & O. R. R.

THE WATERS: Thermal.

HOW LONG KNOWN AND USED: For more than seventy-five years.

EMERGENCE: From west base of Warm Spring Mountain.

SOURCES: Three large springs.

QUANTITY OF WATER DISCHARGED PER HOUR: About three hundred thousand gallons

TEMPERATURE: 98° Fahr.

PARTICULAR CHARACTER: Limpid and gaseous.

EMPLOYED: Principally in bathing.

SITUATION: About twenty-five hundred feet above sea level.

CLIMATE: Salubrious and delightfully cool.

SEASON: From the 1st of May to 1st of November.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: These waters are valuable in affections of the respiratory organs and in dyspepsia dependent upon abdominal plethera; they are sometimes aperient and diuretic when taken internally. They are peculiarly applicable, when administered by baths, in all forms of rheumatism and gout, in neuralgia, especially lumbago and sciatica, and in the congestive forms of the menstrual functions and other female affections.

Analysis.

Sulphate of potash	1.371	grains.
Sulphate of ammonia	0 369	"
Sulphate of lime	14.531	"
Carbonate of lime	5.220	"
Crenate of iron	2.498	"
Silicate of magnesia and alumina	1.724	"
Carbonic acid	6.919	"
	32.632	"

WHITE SULPHUR SPRINGS (West Virginia).

LOCATION: In Greenbrier county, West Virginia, on the line of the C. & O. R. R., two hundred and forty-seven miles west from Washington city, and about three hundred and fifty miles east from Cincinnati.

THE WATERS: Cold sulphur.

HOW LONG KNOWN AND USED: For more than a century.

EMERGENCE: In a valley between the Greenbrier and Kates Mountains.

SOURCES: One spring.

QUANTITY OF WATER DISCHARGED: About thirty gallons per minute.

TEMPERATURE: 60° Fahr.

PARTICULAR CHARACTER: Limpid; possessing a strong odor and taste of sulphuretted hydrogen; deposits a white sediment.

EMPLOYED: Principally in drinking.

SITUATION: Two thousand feet above the level of the sea.

CLIMATE: Cool and bracing; heavy fogs usually prevail at night.

SEASON: From the 15th of June to the 1st of October.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Diaphoretic, diuretic and aperient. Mostly used in chronic and acute rheumatism, rheumatic paralysis, diseases of the skin and torpidity of the liver.

Analysis.

Sulphate of lime	67.168
Sulphate of magnesia	30.364
Chloride of magnesium	.859
Carbonate of lime	6 060
Organic matter (dried at 212° F.)	3.740
Carbonic acid	4 584
Silicates (silica 1.34, potash .18, soda .66, magnesia and a trace of oxyd. iron)	2 960
	115.735

YELLOW SULPHUR SPRINGS (West Virginia).

LOCATION: In Mongomery county, Virginia, three and a half miles from Chistiansburg, on the Chesapeake and Ohio Railroad.

THE WATERS: Cold, calcic-sulphur.

HOW LONG KNOWN AND USED: Nearly a hundred years.

EMERGENCE: The spring rises from the eastern slope of the Allegany Mountains, within sixty feet of the summit.

SOURCE: One spring.

QUANTITY OF WATER DISCHARGED: Thirty-six hundred gallons per day.

TEMPERATURE: 55° Fahr.

PARTICULAR CHARACTER: Clear, transparent; deposits a brownish yellow sediment.

EMPLOYED: In drinking and bathing

CLIMATE: Elastic, pure atmosphere; delightfully cool in summer; two thousand feet above the level of the sea.

SEASON: From the 1st of June to the 1st of October.

PHISIOLOGICAL AND THERAPEUTIC ACTION OF WATER: Gently purgative, alterative, tonic and diuretic Valuable in dyspepsia, chronic diarrhœa, skin diseases and of the diseases incident to females.

Analysis.

Carbonate of lime	8.642 grains.
Carbonate of magnesia	1 389 "
Carbonate of protoxide of iron	0.617 "
Free carbonic acid	4.680 "
Sulpate of lime	65.302 "

ANALYSIS—*Continued.*

Sulphate of magnesia	21.098 grains.
Sulphate of Alumina	3 176 "
Sulphate of potash	0.107 "
Sulphate of soda	0.750 "
Protoxide of iron	traces.
Phosphate of lime	0 015 "
Phosphate of magnesia	0.011 "
Chloride of potassium	0 097 "
Chloride of sodium	0 076 "
Organic extractive matter	3.733 "

BAILEY SPRINGS (Alabama).

LOCATION: In Lauderdale county, Alabama, on the Memphis and Charleston Railroad.

THE WATERS are cold. There has never been made a proper analysis. That of Prof. Tugmey is the only one, and is as follows: Carbonate of iron, carbonate of soda, chloride of sodium, carbonate of potassa, sulphur with soda

HOW LONG KNOWN: The water has been used for medical purposes for about fifty years, with steadily increasing reputation.

EMERGENCE: The rock spring emerges from a ledge of cherty rock overlaid with limestone. The brick spring arises apparently in gravel.

SOURCES: There are five different springs emerging within an enclosure fifty feet wide and a hundred and fifty feet long. Each is distinct from the others in its character. They are known as the rock, the brick, the soda, the alum and the freestone.

THE QUANTITY OF WATER DISCHARGED varies. The rock spring, which is the most used, is very small. It will supply the necessities of not more than three hundred patients at the same time. It is not affected in volume by drouth or rain, except that sometimes the surface water inundates it after unusually copious showers; but this soon runs off, leaving the spring as before.

THE TEMPERTURE is that of ordinary spring water.

PARTICULAR CHARACTER: The waters are perfectly clear and limpid. The rock, soda, alum and freestone springs are free from taste or odor The brick spring has a slight smell of sulphur. It tastes strongly of iron.

MEDICAL SERVICE: The medical service of the establishment is administered by one resident physician, and in case of need by the physicians of Florence, a town near by.

EMPLOYED: The water is employed chiefly by internal administration, though it has been found very efficacious as a local application in some diseases of the eyes and skin.

SITUATION: The springs issue from an indenture in the highest elevation in the neighborhood. The hotel can be seen for miles

upon the summit of this elevation. The indenture gives the hill the semblance of a horseshoe. The buildings are upon this horseshoe, and surround the springs on three sides. The fourth side is an incline that leads down through a romantic ravine by a succession of cascades to a stream known as "Shoal Creek." It is a mountain river with rocky bottom, and is full of bass.

THE CLIMATE is that of Alabama, tempered by elevation. The breeze being unimpeded is almost perpetual. There is hardly a night in summer when a blanket is not required for comfort.

SEASON: As it is a resort for both invalids and pleasure seekers, the place is kept open all the year. The summer guests usually begin to arrive about the middle of June and remain till cool weather in autum.

PHYSIOLOGICAL AND THERAPEUTIC ACTION OF THE WATER: The rock spring water is the most used in cases of disease. It is a most powerful diuretic, alterative and nerve sedative. It is much used in cases of dropsy to remove the effusion. In scrofula, dyspepsia and diseases of the skin, its alterative effect renders it very valuable. Its action as a nerve sedative is positive. In incipient dipsomania it relieves the agitation and obliterates the thirst for alcohol. This strange property is so well known in the neighboring town that patients trying to relinquish the use of stimulants use no other water. It is also useful in diseases peculiar to women, particularly those associated with nervous derangements. In disorders of the kidneys it is very useful. Cases of lithic and oxalic deposit are alike benefited, though whether the result is due to chemical or mechanical action has never been determined. There are also on record several well authenticated cases of Bright's disease that have been permanently cured by its use. The brick spring is tonic, chalybeate, alterative and slightly purgative. It is excellently adapted for the use of persons suffering from no disease, but debilitated and fatigued by overwork or too close attention to business. The freestone water is not considered medicinal. The alum has only been employed as a bath for weak or sore eyes. The soda is sometimes used in cases of dyspepsia, but is considered inferior to the rock.

TABLE

Of the Best Known Mineral Springs in America

Those marked thus * are described in this volume.

Abenaquis	N. H.
Adams	Ohio.
Albany, Artesian Well	N. Y.
Alburg	Vt.
*Alleghany	Va.
Alpena	Mich.
Amherst	N. H.
Augusta	Va.
*Avon	N. Y.
Baily	Ala.
*Ballston	N. Y.
Bartlett	Cal.
*Bath Alum	Va.
*Bedford	Penn.
Bedford	Ky.
Bedford Alum	Va.
Beersheeba	Tenn.
*Berkeley	W. Va.
Berkeshire Soda	Mass.
*Bethesda	Wis.
Bethesda	Ga.
Big Bone	Ky.
Birch Dale	N. H.
*Bladen	Ala.
Blossburg	Pa.
Blount	Ala.
*Blue Lick	Ky.
*Blue Ridge	Va.
Blue Sulphur	W. Va
Botetourt	Va.
Bradford	N. H.
*Buffalo Lithia	Va.
Burners	Va.
Butterworths	Mich.
Calestoga	Cal.
*Capon	W. Va.
Cappers	Va.
Carlisle	Pa.
Catoosa	Ga.
Central	Vt.
Chittenango	N. Y.
Clarendon	Vt.
Clifton	N. Y.
Columbian	N. Y.
Congress	Col.
Congress	N. Y.
Coyners	Va.
Crab Orchard	Ky.
Cresson	Pa.
Crystal	Cal.
Crystal	N. Y.
Dagger's	Va.
DeSota	La.
Dibrell's	Va.
Drennon	Ky.
Dryden	N. Y.
Eaton Rapids	Mich.
Eggleston's	Va.
Elgin	Vt.
Ellis	N. Y.
Empire	N. Y.
Esculapia	Ky.
Estill	Ky.
Eureka	N. Y.
Excelsior	N. Y.
*Fauquier White Sulphur	Va.

Fayette.....Pa.
Fox.....Ky.
French, Lick.....Ind.
Fruit, Port.....Mich.
Frys, Soda.....Cal

*Gettysburg .....Pa.
Geyser.....N. Y.
Geysers .....Cal.
Geysers.....Wyo.
Gilroy.....Cal.
Glenn .....S. C.
Grand Lodge.....Mich.
Great Salt Lake.....Utah.
Green Castle.....Ind
Green Cove. .....Fla.
Grayson..... .....Ky.
Grayson..... .....Va.

Hamilton.....N. Y.
Harbines.....Col.
*Harrodsburg..... Ky.
Hathorn.... .....N. Y.
*Healing.....Va.
High Rock..... .....N. Y.
High Gate .....Vt.
*Hot.....Ark.
*Hot.....Va.
Huganot.....Va.

Idaho.....Col.
Indian..... .....Ga.
Indian.... .....Ind.

*Jordan's.....Va.

Lafayette.....Ind.
Lansing.....Mich.
Latona.....Ky.
*Lebanon..... ...N. Y.
Leslie .....Mich.
Lodi..... Ind.

Messena.. .....N. Y.
Middle Park.....Col.
Middletown.....Vt.
Midland.....Mich.

Mineral.....N. J.
Mineral.....Ohio.
Minnequa.....Pa.
Mississquoi ....Vt.
Montgomery.....Va.
*Montvale.....Tenn.

Napa Soda.....Cal.
Newberry.....Vt.

Oak Orchard.....N. Y.
*Old Sweet.....Va.
Olymphian.....Ky.
Orange.....Fla.
*Orkney.....Va.
Owosso.....Mich.

Paroquet.....Ky.
Paso Robles.....Cal.
Perry.....Ill.
Piedmont.....Cal.
Piedmont.....Tenn.
Puebla ....Nev.
Putnam .....N. Y.

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*Red Sweet..... Va.
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*Roanoke Red Sulphur....Va.
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Shocco.....N. C.
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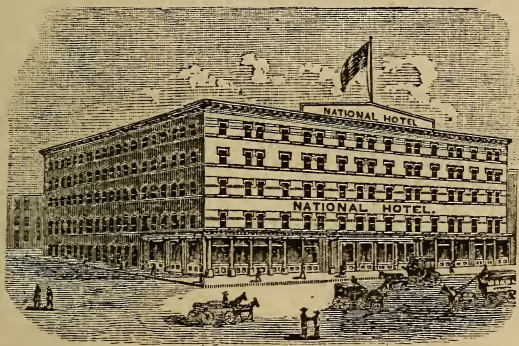

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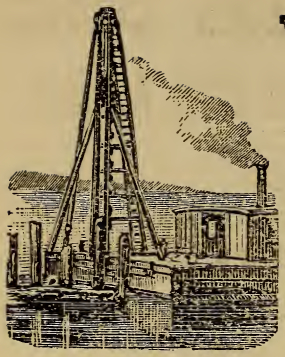

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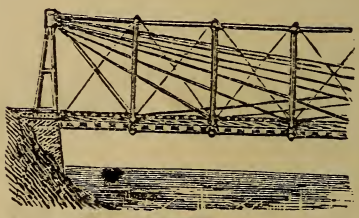

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